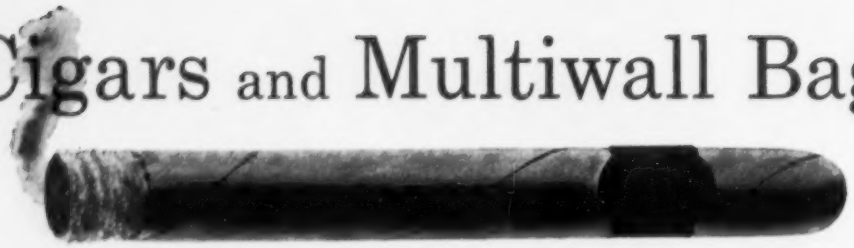
AUGUST, 1956

Commercial Fertilizer

and PLANT FOOD INDUSTRY

Cigars and Multiwall Bags



Kraft Bag Corporation, as a manufacturer of multiwall bags, is in the same position as the cigar manufacturer who complained that everything to be said about his 25c cigars had already been said about 5-centers!

...but there is no doubt about the quality of the multiwall bags that bear the Kraft Bag Corporation stamp!

Our completely integrated plants and modern facilities producing every type of heavy-duty valve or open mouth bag, are second to none!

As an exponent of true specialization, there isn't a single known or desirable time-and-labor-saving development that we haven't already either considered, initiated, adopted or built into multiwall bags we are called upon to make for America's industries, while continuing our search for still better ways to package our customers' products.

If your product can be packaged in a multiwall bag—you can depend on us to make the bag to fit your product.

Investigate **The KRAFTPACKER®** *Open Mouth Bag Filling Machine for free-flowing material ... highest accuracy and production... reduces packaging costs at an unbelievable rate.*

KRAFT BAG CORPORATION

Gilman Paper Company Subsidiary

630 Fifth Avenue, New York 20, N. Y.
Daily News Bldg., Chicago 6, Ill.

Plants at St. Marys, Georgia and Gilman, Vermont

SALESMEN... to help boost YOUR profits!

LION Advertisements Sell LION Nitrogen, *and* Your Mixed Goods, Too!

Continuous Lion advertising appears in leading farm publications, month-after-month, to pre-sell the Lion brand to farmers—and to sell the value of *your mixed fertilizers as well!*

Current advertisements are appearing in Farm and Ranch-Southern Agriculturist, Progressive Farmer, The Farmer, Nebraska Farmer, Kansas Farmer, Prairie Farmer, Wallace's Farmer & Iowa Homestead, Wisconsin Agriculturist and Farmer, Missouri Ruralist and Missouri Farmer. All of these advertisements are in color.

Each Lion advertisement promotes the economic benefits of properly using fertilizers, including Lion Ammonium Nitrate, to help increase the farmer's profits. Each advertisement sells *hard* on the importance of soil tests in the intelligent use of all commercial fertilizers. Lion, a leader in nitrogen production, leads the way to good fertilization practices . . . to better profits for you!

LION'S QUALITY LINE OF NITROGEN FERTILIZER MATERIALS

LION ANHYDROUS AMMONIA—82.2% nitrogen. Quality guaranteed.
LION AQUA AMMONIA—Ammonia content above 30%—other grades to suit your requirements.
LION AMMONIUM NITRATE FERTILIZER—Improved spherical pellets. Guaranteed 33.5% nitrogen.
LION NITROGEN FERTILIZER SOLUTIONS—Various types to suit your particular manufacturing needs.
LION SULPHATE OF AMMONIA—White, uniform, free-flowing crystals. Guaranteed 21% nitrogen.

LION OIL COMPANY

A DIVISION OF MONSANTO CHEMICAL COMPANY

EL DORADO, ARKANSAS

DISTRICT SALES OFFICES: Lion Oil Building, El Dorado, Ark. • Insurance Exchange Building, Des Moines, Ia. National Bank of Commerce Building, New Orleans, La. • 1401 Building, Atlanta, Ga.

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Commercial Fertilizer
and PLANT FOOD INDUSTRY

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Contents

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Commenting Freely

by Bruce Moran

It may seem to many in our industry that this is no time to be sinking money into plant modernization—buying new equipment and junking the old. But the facts of current conditions stress the wisdom of modernizing now . . . for economy which is vital today, and will be even more so in the near future.

As steel wages rise, so will other wages. As the price of steel goes up, so will other prices. There is no hope that equipment will cost less, nor that wages are going down. And in a period of intense competition between overproduced industry factors, economy of operation is mighty important.

The fertilizer manufacturer who wants to meet his competition and still make a profit must find ways to plant efficiency. And so long as plants are doing by hand what can be done by machine—we will not have reached full efficiency.

Our industry is not overproduced. It is underconsumed. If the farmer would follow his Land Grant College recommendations, we would be grossly underproduced in a hurry. And as the population swells, and the "Fifth Plate" must be set on the table, we may have trouble meeting the world's need with the production we have now, plus what is in process of construction.

Standard of the Industry

GRANULATION OF MIXED FERTILIZERS

"KEYSTONE OF THE INDUSTRY"

WEATHERLY PROCESS

DESIGNED BY

THE D. M. WEATHERLY CO.
ATLANTA, GA.

Unknown a year ago last June, from a standing start the Weatherly Controlled Granulation Process has grown in acceptance until today it is turning out more quality tonnage, plant for plant, than any other method . . . the standard by which the industry now judges granulation. BECAUSE:

It produces granular goods that sell better due to close sizing—through 6 mesh, retained on 16 mesh screen. It makes a high volume of high quality, uniform analysis goods from the lowest cost materials. It is built of quality, heavy-duty components.

Let us tell you about it . . . show you Weatherly units in action . . . let you talk to operators with a season's experience.

Weatherly Controlled Granulation 20-60 tons per hour

The D. M. WEATHERLY COMPANY

Industrial Engineers and Builders

830 Ponce de Leon Ave., N.E., Atlanta, Georgia Phone: TRinity 5-7986

We are telling millions of farmers

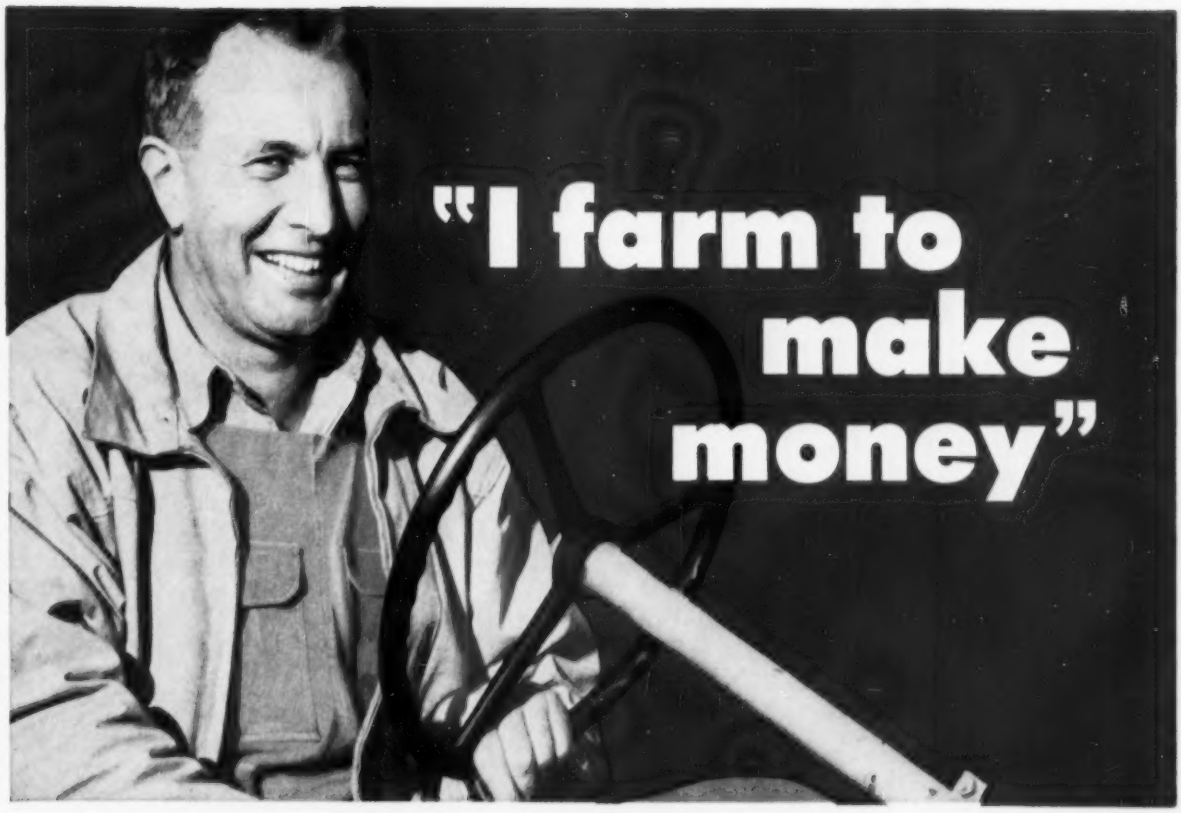
Fertilizer Grows Farm Profits

Farming today requires a bigger investment per worker than most major industries. It takes money to make money farming.

Fertilizer is one of the lowest cost items the farmer buys, closer to pre-war prices than anything else needed to grow crops. Fertilizer helps a farmer to get greater returns from his other investments in land, labor, machinery and other production costs.

The vital importance of fertilizer to the farmer is being brought to the attention of millions of readers of farm magazines in a powerful and continuing campaign conducted by Nitrogen Division, Allied Chemical & Dye Corporation.

Shown on the opposite page is one in a series of big, full-page advertisements appearing in farm magazines. Others have preceded it and more will follow. We trust that this campaign meets with your approval and we will greatly appreciate any comments or suggestions you may wish to send us.



"My farm has been in my family more than 100 years—and it has been making money most of that time. It's making money today, with the help of a good rotation, deep soil that holds water, and plenty of fertilizer. My grandfather had a plow, an axe, a corn knife and a flail, a cradle and a scythe—plus some mighty well calloused hands. He and my dad farmed on their feet; I try to farm from my tractor seat. I've got more power, more machinery, better seed, bigger fields and less hired help. Best of all, I've got more fertilizer and I use it.

"My pastures aren't just exercise lots for my cows. Fertilizer makes the grass roots shoot up real feed. My corn and wheat fields aren't just exercise lots for me and my plow and combine or corn picker. They produce grain—and profits.

"I'm not seeding as much wheat land as I did three years ago. But a 40-acre lot with 8 tons of fertilizer turned out more profit in '56 than 60 acres with 3 tons of fertilizer in '55. That's why I'm putting 8 tons on 33 acres of wheat this fall. I used to stay about the state average with 25-bushel acre yields. This summer I got 36 bushels. With good moisture next winter, I figure to combine close to 1,300 bushels of wheat next July. And I'll make some money—without piling up any surplus grain.

"I'm feeding more corn than I sell. Except for a couple of real dry years, I've boosted my per-acre yield every year for the last 10 years. The right hybrid helps—but fertilizer really does the trick. This year I'm using about $32 worth of fertilizer per acre of corn. The way it's earing out, I should get a yield well over 100 bushels. This corn won't cost me more than 60 cents a bushel in the crib.

"Yes—I farm from where I sit on my tractor. From here, I can't figure out this year's farm program, or next year's. But I know I can grow crops cheaper when I use enough fertilizer. My County Agent says fertilizer is lower priced than anything else I buy to grow a crop. He says it's so and I know it works. Fertilizer, makes crops grow profits. That's what I'm interested in—acres that make me money—not acres that just keep me busy.

"Fertilizer pulled me through my toughest year—a drouth in '36. And I figure fertilizer will work better now, because I use more of it. Big acre yields with fertilizer help me squeeze down the cost per bushel—so I can squeeze out a better profit."

See Your County Agent

Ask your County Agent to recommend the analyses and the amounts of fertilizers best suited for your crops and soils. His advice to you is based on the latest official recommendations from your Extension Service and Experiment Station.

See Your Banker

Bankers are alert to good investments. They know that fertilizer pays a big return in bigger yields of better quality crops. If you need money to buy more fertilizer, talk it over with your banker.

See Your Dealer

Your fertilizer dealer can supply you with a good brand of fertilizer in the amounts and analyses as recommended by your County Agent. Help your dealer to get your fertilizer to you on time by placing your order early and accepting prompt delivery. It pays to have your fertilizer on hand when you need it. Remember, fertilizer grows farm profits. *Make sure you use enough this year!*

The fertilizer industry serves the farmer. Nitrogen Division serves the fertilizer industry as America's leading supplier of nitrogen for use in mixed fertilizers.

NITROGEN DIVISION Allied Chemical & Dye Corporation
New York 6, N. Y. • Hopewell, Va. • Ironton, Ohio
Omaha 7, Neb. • Indianapolis 39, Ind. • Columbia 1, S. C.
Atlanta 3, Ga. • Kalamazoo, Mich. • Columbia, Mo.

Fertilizer Grows Farm Profits

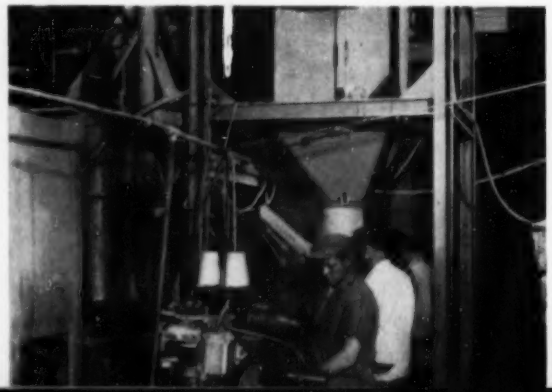
The Man from

opens new doors to Multiwall

DOOR ONE—A PASTED VALVE BAG DESIGNED FOR FERTILIZER

Have you seen the new St. Regis Pasted Valve Bag? It's going over big with packers of granular fertilizers. It has a new insert sleeve that closes securely against the squared bag top . . . and that means less siftage, cleaner packages, far less waste. You'll like the way the squared bag top gives you more room for your brand imprint and instructions. It makes for better stacking and loading, too.

DOOR TWO—AN AUTOMATIC BAGGING SCALE THAT SPEEDS WEIGHING— You'll like the St. Regis 135-AS Model F automatic bagging scale because it operates on a pace-setting basis, giving you the high output needed in the short shipping season. This St. Regis scale gives you accurate weights within 5 oz. on 95% of all bags packed. Its single-bucket design means quick clean-out, fast weight adjustment, minimum downtime for grade changes.



St. Regis
bag savings

DOOR THREE—YOU OPEN THIS ONE—St. Regis invites you to find out more about the Pasted Valve Bag, the 135-AS Model F Scale and the many other improvements in bagging, bagging equipment, palletizing, shipping, stacking, etc. The Man from St. Regis will bring you the information you want. Write for facts on the Pasted Valve Bag, the 135-AS Model F bagging scale or other St. Regis developments in the multiwall field.

ST. REGIS PAPER COMPANY

Behind the Man from St. Regis stand experts in every field of packaging, ready to serve you.

Multiwall Packaging Division
St. Regis Paper Company, Dept. CF 856
150 East 42nd Street, New York 17, New York

Please send more information about_____Pasted Valve Bag
_____135-AS Model F

NAME_____ TITLE_____
FIRM_____
ADDRESS_____
CITY_____ STATE_____

JUST AROUND THE CORNER *by Vernon Mount*

$5,520 is the average family income in these United States today. A three year average figure shows $5,410, nearly $600 higher than the average of the previous three years, which were during the Korean War. The progress of our people, from $100 a year, to $100 a month, to $100 a week, has taken place rapidly through the past two decades or so.

HIGHER BRACKET are enjoyed by a lot more of us. During the past three years, nearly three million more people have moved into the middle - income area - $5,000 to $10,000. There are 1,500,000 fewer in the under - $5,000 bracket now than there were in 1952. And some 700,000 more families are now in the upper bracket - over $10,000 - than there were three years ago. The work force has grown by about 3,000,000 persons . . . and just the other day the Gross National Product rate broke through the all-time top, to reach $400,000,000,000 a year.

INFLATION? No! Prosperity, yes!!

Yours faithfully,

Vernon Mount

AA QUALITY

YOUR DEPENDABLE SOURCE OF SUPPLY

AGRICO FERTILIZER PLANT, FULTON, ILLINOIS. This modern A.A.C. plant is at your service with an annual capacity of [illegible],000 tons.

HOW YOU GET MORE FOR YOUR DOLLAR with A.A.C. Co. Quality Products

AA® QUALITY PRODUCTS:

Florida Phosphate Rock • Superphosphate
AA QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers • Gelatin
Bone Products • Salt Cake • Fluosilicates
Ammonium Carbonate • Sulphuric Acid
Insecticides and Fungicides
Phosphoric Acid and Phosphates
Phosphorus and Compounds of Phosphorus

With the A.A.C. Co. you get the benefits of:

- Uniform Quality through Rigid Laboratory Control
- Dependable Source of Supply
- Tremendous Production Facilities & Resources
- Nearly 100 years Experience

Phone or write to:

The AMERICAN AGRICULTURAL CHEMICAL CO.

Miners of Phosphate Rock — Manufacturers of

CHEMICALS FOR FARM AND INDUSTRY

31 Factories and Sales Offices, Assuring Dependable Service to United States, Canada and Cuba.

General Office: 50 Church Street, New York 7, N. Y.

GRANULATING? COATING?

TECHNICAL DATA

CONVEYOFLO® METER: for any belt conveyed material . . . automatically paces auxiliary feeders . . . meters total plant output. For installation in existing conveyors . . . or furnished complete with conveyor unit.

BUILDERS CONVEYOFLO METER

Features: compactness, continuous integration, accurate response to load variations. Accuracy within ±0.4 of 1% of full scale over 10:1 range. Overload protection, automatic compensation, inherent explosion-proof design.

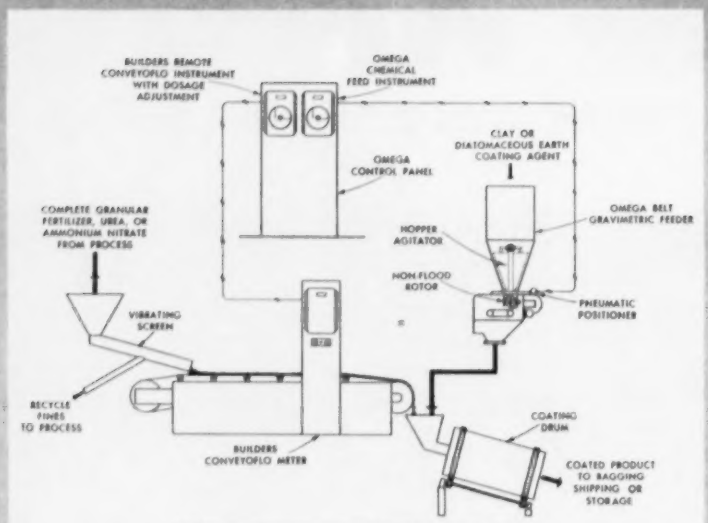
GRAVIMETRIC FEEDER: Accurate, rugged dry materials feeder for medium feed rates. Features: feed rates to 2 cu. ft./min.; accuracy within ±1% by weight over full 100 to 1 feed range; large weight-sensing section; no belt slippage or training; non-flood rotor;

OMEGA GRAVIMETRIC FEEDER

rapid rate setting; Sens-A-Gram controller; sampling gate optional.

RELATED EQUIPMENT for compounding fertilizers: ROTODIP LIQUID FEEDER — for feeding unrefined phosphoric acid in superphosphate production; HI-WEIGH BELT GRAVIMETRIC FEEDER — for continuously weighing and feeding medium to high rates.

"THE BEST COSTS LESS"



B-I-F Equipment Proportioning Coating Agent to Hygroscopic Materials

CUT COATING COSTS THE Ω OMEGA WAY!

THE PROBLEM:

The current trend toward granulated fertilizers . . . based on multi-component formulas . . . makes it essential to select proper automation-type conveyor equipment to achieve the high compounding accuracies and production rates required. Also with the increased demand for higher and higher analysis granular plant foods, the need for a system which can properly and efficiently coat hygroscopic granules or prills with a parting agent (clay or diatomaceous earth) increases.

THE ANSWER:

Ω OMEGA MACHINE COMPANY, as a leading manufacturer of this type of equipment, has the design, manufacturing, and installation experience to help you increase the profit factor of your formulating process. *Coating costs can be cut* by the Omega performance-proved proportioning system . . . with coating material fed from the Model 50-8R *non-flooding*, gravimetric belt feeder to the product stream being weighed by Builders Conveyoflo®, and proportioned in accurately controlled ratio. Outstanding features on two such units which work for your benefit are listed under TECHNICAL DATA. Increase your competitive advantage by making your operation as modern as tomorrow!

ACT TODAY!

For Bulletins write **OMEGA MACHINE COMPANY**, 538 Harris Avenue, Providence, R. I. . . . division of . . .

B-I-F INDUSTRIES

PROVIDENCE, RHODE ISLAND

METERS FEEDERS CONTROLS

BUILDERS IRON FOUNDRY • PROPORTIONEERS, INC. • OMEGA MACHINE CO. • BUILDERS-PROVIDENCE, INC.

TENNESSEE CORPORATION

TRIPLE SUPER-PHOSPHATE

1. RUN-OF-PILE FOR MAXIMUM AMMONIATION
2. GRANULAR FOR DIRECT APPLICATION
3. PROMPT SERVICE TO MEET EVERY REQUIREMENT

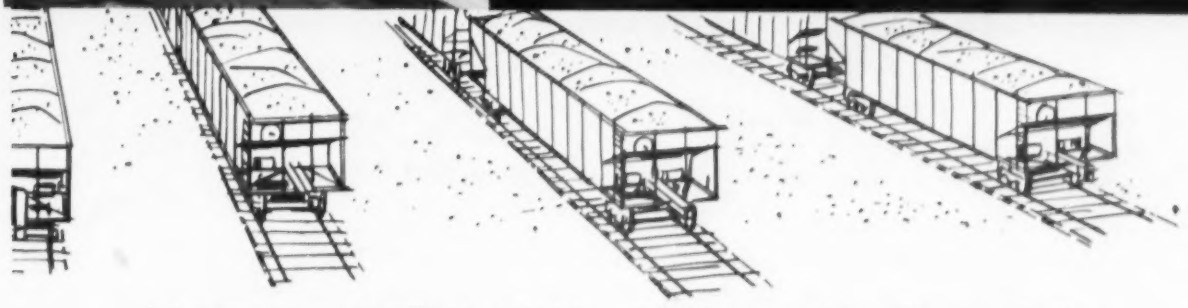
There is no better source for quality and dependability in Triple Superphosphate than U. S. Phosphoric Products. For nearly 30 years, this company has been producing superior phosphate fertilizers for maximum satisfaction and efficiency. Call upon your Bradley & Baker sales representative today to help you plan your shipments to your greatest advantage.

U.S. PHOSPHORIC PRODUCTS
Division TENNESSEE CORPORATION Tampa, Florida

Sales agents: **BRADLEY & BAKER**
155 EAST 44th STREET • NEW YORK 17, N. Y.
District Sales Offices: ATLANTA • INDIANAPOLIS
ST. LOUIS • NORFOLK • HOUSTON

are this year's contracts

They tried . . .
were satisfied
. . . and signed



In just one year, over ¼ million tons of triple super sales have switched to Bonnie. That's how we know there's a new sense of satisfaction among triple super users this year.

In typical cases, manufacturers ordered spot shipments . . . tried our triple . . . and were satisfied. And before long, the word got around — "International's new triple is *really* good." In fact, even nitrogen producers began recommending our triple to their customers with ammoniation problems. The reasons?

Reliability — one high-quality source. *Quality* — unbeatable control with product uniformity that makes formulation easier. *Fast service* — mammoth inventory at conveniently-located warehouses. *Priced right* — to help you meet competition. *Friendly cooperation* — from International's transportation department. *Technical assistance* — that helps cut formulation costs.

If you have not already signed, we invite you to consider International.

INTERNATIONAL MINERALS & CHEMICAL CORPORATION

Phosphate Chemicals Division • General Offices: 20 North Wacker Drive, Chicago 6

DU PONT URAMON® Ammonia Liquors

are non-corrosive . . . easy on your equipment

This mild steel tank car has carried UAL for over 23 years!

UAL is easy and economical to use. It can be used in ordinary steel equipment.

The excellent conditioning effect of UAL gives mixed fertilizers better "feel". . . can often speed curing. And UAL minimizes dusting, segregation and setting of conventional fertilizer mixtures.

In granulation, too, UAL works well! Gives hard, uniform granules that are best for storage and application. If you're thinking of granulation in your future plans, ask us about UAL.

You'll like the on-time delivery of UAL. There are four formulations available. For technical assistance and information on the formulation best suited to your use, write Du Pont.

URAMON®
AMMONIA LIQUORS

E. I. DU PONT DE NEMOURS & CO. (INC.)
Polychemicals Department, Wilmington 98, Delaware

1616 Walnut St.
Philadelphia 3, Pa.

7250 N. Cicero Ave.
Chicago 30, Ill.

Du Pont Company of Canada Limited
85 Eglinton Avenue East, Toronto 12, Ontario

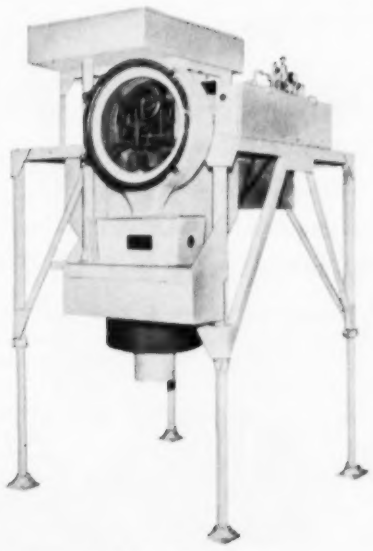
DU PONT

Better Things for Better Living . . . *through Chemistry*

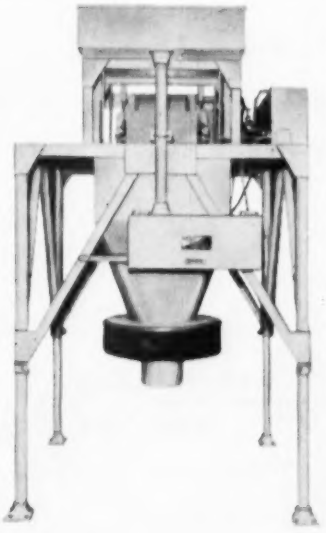
When your trade demands 50's

keep your packaging costs down

with the UNION I&C BAGGER



MODEL UB 101 (Dial Scale)
for finer weight tolerances and visible weight check



MODEL UB 100-A (Double Beam Scale)
for accurate, high speed weighing of granular materials

If you are faced with the necessity of packaging in 50-lb. units, the Union I & C Bagger can help you eliminate the increased packaging expenses you would otherwise face.

The Union Bagger easily handles up to twenty 50-lb. bags a minute. You can convert from 100-lb. containers and still maintain your net tonnage per hour.

Over 300 Union Baggers have been installed by fertilizer manufacturers in the past two years alone. The savings you make with this automatic and practically fool-proof high speed equipment not only improve your competitive position, but your savings alone actually pay the full cost of the Bagger in a remarkably short period of time.

We will be glad to demonstrate with actual figures based on recent fertilizer installations.

Ends "rush season" production worries, brings about greatest savings, fertilizer executives report

SOLVES RUSH SEASON SHIPPING PROBLEMS

"Your UB-101 machine has proved to be more than adequate in every phase of performance."

P. L. Etheredge, Secretary-Treasurer
Etheredge Guano Company, Inc., Augusta, Ga.

ELIMINATES ALL OVERTIME

"We were able to eliminate all overtime during the past two seasons, which I am convinced more than compensated us for the small cost of the baggers.

"The speed and accuracy of these units made the many thousands of tons we handled during the rush period a pleasure.

"One of the most significant features is the lack of maintenance. The amount we have expended would not exceed $25 for the past two years."

C. P. Belding, Supt., F. S. Royster Guano Company, Athens, Ga.

PRODUCTION UP 50%—LABOR SAVINGS 33%

"The Union I & C Bagger has enabled us to increase production to 50 to 60 tons per hour, compared with 35 to 40 tons in the past, and we are able to do it with two men instead of three. The Union Bagger is as fast and efficient a bagger as I've ever encountered. Its performance has been little short of sensational."

C. L. Durham, Plant Superintendent
Dixie Guano Co., Laurinburg, N. C.

UNION I&C BAGGER

Automatic Weighing and Filling Machine for Open Mouth Bags

Manufactured by INGLETT & CORLEY, INC., AUGUSTA, GA.
Exclusive Sales Agents:
PACKAGE ENGINEERING DEPARTMENT
UNION BAG & PAPER CORPORATION
Woolworth Building, New York 7, N. Y.

NEW! SEND FOR UNION'S AUTHORITATIVE AND PRACTICAL "FERTILIZER PACKAGING WORK KIT"

Package Engineering Department
Union Bag & Paper Corporation
Woolworth Building, New York 7, N. Y.

Please send immediately your new "Fertilizer Packaging Work Kit" which includes a new calculator for figuring our bagging cost-per-ton. I understand there is no charge or obligation.

Name ..... Title .....

Company .....

Address .....

City ..... Zone .... State .....

Elbert N. Carvel, of Laurel, Del., Robert A. Fischer, president of the association, Claude C. Phillips, of the University of Delaware, and H. L. Dunton of V. P. I.

PHILLIPS GIVEN GOLD WATCH AT 35TH ANNUAL DELMARVA MEET

Claude C. Phillips of the University of Delaware received an award of the Delmarva Peninsula Fertilizer Association for his contributions to agriculture on the Delmarva Penninsula in 1955, a gold watch. Such awards will become an annual event from now on.

Presenting the award, Elbert N. Carvel of Laurel, Del., praised Mr. Phillips for his work in the 100 bu. per acre yield corn club and the 40 bushel per acre yield soybean clubs and also on the pasture improvement programs. This award was presented at the 35th annual convention of the Association held at the Washington Hotel, Ocean City, June 30.

The program featured H. L. Dunton of the Virginia Polytechnic Institute of Blacksburg, Va., who spoke on the subject "What Every Fertilizer Salesman Should Know." The meeting was attended by over 125 people representing farm, industry, and state experimental and control offices.

Mr. Dunton talked about the soil as a factory to which the fertilizer representatives should supply the right raw materials for this factory. He said that too many farmers were now trying to produce too many different crops using the same analysis fertilizer. This was especially true when there were several types of soil on the same farm. He also said that it is the responsibility of the fertilizer companies to help guide the farmer in the proper utilization of the soil for maximum production.

450 ATTEND THREE MEETINGS STAGED BY GEORGIA SOCIETY

Georgia's summer fertilizer conferences were held at three locations in the state during July. Meetings were conducted at experiment stations in Griffin on July 10 (Northwest district), Athens on July 11 (Northeast district), and Tifton on July 13 (Southwest and Southeast districts).

Sponsored jointly by the Agricultural Extension Service, State College of Agriculture, and the Georgia Plant Food Educational Society, the programs attracted fertilizer manufacturers, dealers and larger growers from all over the state.

Mornings were devoted to tours of the stations conducted by the director and the head of the agronomy department, with station personnel describing various phases of the research in progress there.

Following luncheon, the district PFES vice president stepped in to conduct the afternoon session. Progress in fertilizer recommendations was outlined in a panel manned by Extension Agronomists J. R. Johnson (project leader), Ralph Wehunt (soils and fertilizer) and P. J. Bergeaux (fertilizer specialist); each handled a topic as they reviewed fertilization practices in cotton, corn and pastures through the state's history of plant food usage.

George King, director of Georgia Experiment Stations, talked about fertilizer potential created by research. Pointing out that today's expenditures for maintenance of machinery by the state's farmers exceed the total farm income for the state in 1924, he predicted that 1970 will see a consumption of at least twice the amount of fertilizer now used in Georgia—and this, he felt, is a conservative estimate.

Paul Jolley, chief of the Fertilizer Division, Ga. Department of Agriculture, spoke briefly about the new system for grade reporting and asked cooperation of manufacturers in reporting counties on invoice copies, so that the by-county grade analysis can be compiled promptly and accurately.

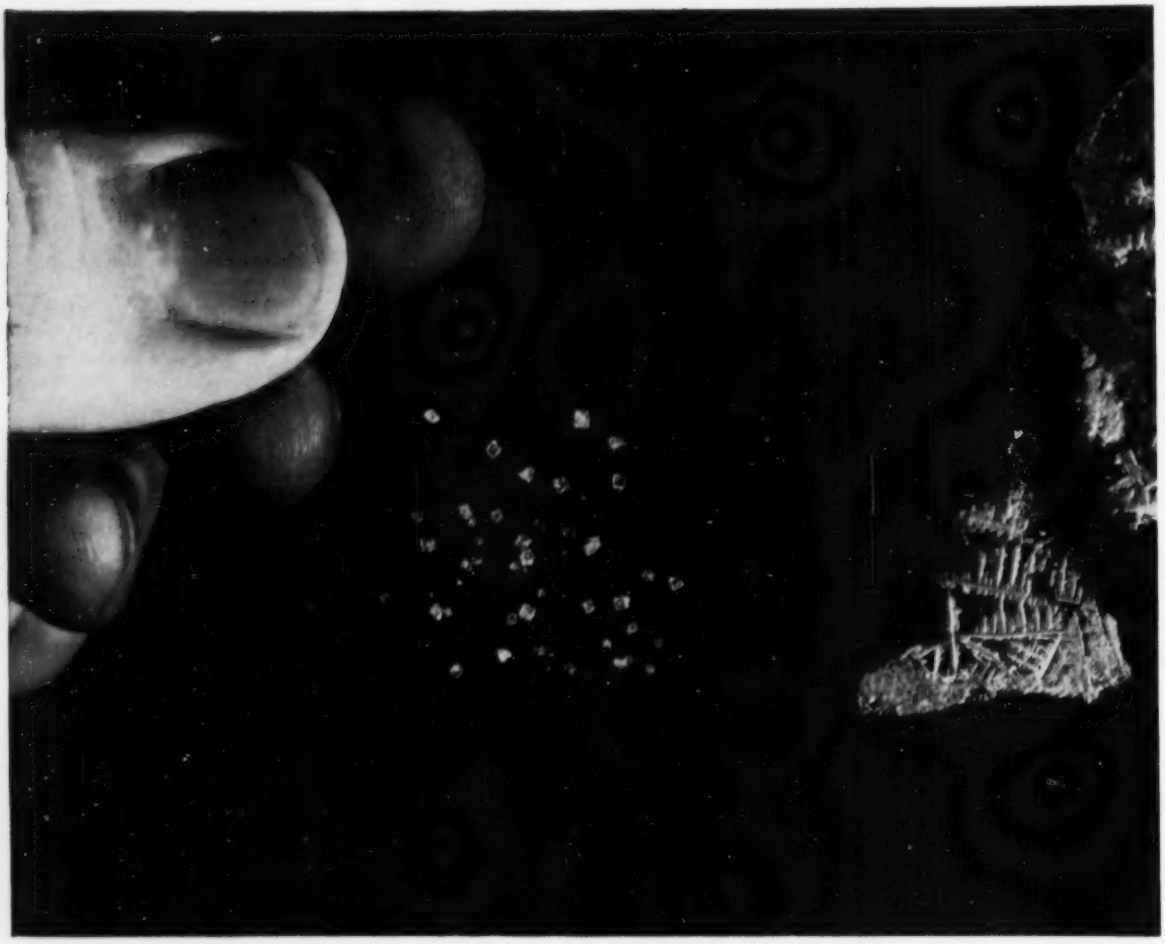
Final feature of each day's program was a forum conducted by L. W. Eberhart, Jr., assistant director of the Agricultural Extension Service. This forum placed before the audience all those who had appeared on the sessions that day, and opened the floor to questions directed at them.

Announcement was made of a series of 27 fertilizer meetings to be conducted by the Agricultural Extension Service throughout the state during the late summer and early fall. Designed especially for fertilizer dealers and salesmen, the eight-point two-hour program will follow the same pattern at each meeting, and should do much toward strengthening the industry's "contact points" with the consumer.

New general fertilizer recommendations for crops and soils in the state were distributed to all present, along with a table of estimates by county agents of amounts per acre, analysis and total amounts of fertilizer used with various crops in the state during 1955.

Total attendance at the three area meetings exceeded 450.

LOCAL AND INDUSTRY-WIDE NEWS OF ASSOCIATIONS



How to cut cake with a cube

TAKE a fern-shaped ammonium chloride crystal. Change its form to a cube, and you've cut fertilizer caking and bag-set in a hurry.

In fertilizers, ammonium chloride is formed during the mixing process by reactions between nitrogen materials and potassium chloride.

Ordinarily, it develops into fern-shaped crystals with hundreds of tiny, finger-like projections like those shown at right above. These crystals will cement fertilizer particles into a cake.

But now you can shape those crystals into non-caking cubes — and do it every time — with Sohiogen ammoniation solutions.

Sohiogen solutions No. 10 and No. 15 are specially formulated with ammonia, ammonium nitrate and urea. And urea has the ability to transform ammonium chloride crystals into square-edged, free-flowing cubes.

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ACS TAKES A THOROUGH LOOK AT CHEMICALS IN FOOD PRODUCTION

The Division of Chemical Marketing and Economics will present a two-day symposium on "Chemicals in Food Production" at American Chemical Society's national meeting in Atlantic City September 18. **Hugo Riemer,** president, Nitrogen Division, Allied Chemical and Dye Corp. is general chairman for this symposium. There will be four ½-day symposia, each covering a major phase of the subject.

On September 18 in the morning, a symposium headed by **Dr. M. F. Fogler,** executive vice president, Nitrogen Division, Allied Chemical and Dye Corp., will discuss all of the important areas related to the Chemical Fertilizer Industry.

At this symposium, invited presentations will be made by:

C. Y. Thomas, vice president, Spencer Chemical Co., "The Role of Nitrogen in Our Nation's Future."

Edwin Cox, vice president, Virginia-Carolina Chemical Co., "Phosphatic Fertilizers — 1956 — How Far—Where To?"

Dr. J. Fielding Reed, Southern manager, American Potash Institute, "Potash in Food Production."

Dr. Russell Coleman, executive vice president, National Plant Food Institute, "Promoting Proper Plant Food Usage."

In the afternoon of the same day a symposium on "Pesticides" will be chairmaned by Dr. Carlton A. Sears, Fine Chemicals Division, American Cyanamid Co. This symposium will cover the important phases of this part of the chemical industry in relation to research and development, production, sales, and end use patterns.

The following invited papers will be presented by leaders in the Chemical Pesticide Industry: Dr. J. T. Thurston, Director of Laboratories, Stamford Research, American Cyanamid Co., "Planning Research and Development for the Successful Commercialization of Pesticides." J. Steele Brown, production manager, Agricultural Chemicals, General Chemical Division, Allied Chemical & Dye Corp., "Manufacturing For the Pesticide Industry." F. W. Hatch, manager, Agricultural Chemicals Division, Shell Chemical Co., "End Use Patterns Present and Projected for Pesticides." Ernest Hart, president, Food Machinery and Chemical Corp., "Problems Related to the Successful Marketing of Pesticides."

On the morning of September 19 a symposium entitled "New Directions" will deal with synthetic nitrogen materials as feed supplements. That afternoon, a symposium will present important considerations related to the Pure Food and Drug Laws.

In addition to the two-day program, a dinner is planned on Monday, September 17, sponsored jointly by the Agricultural and Food and the Chemical Marketing and Economics Divisions of the society. A keynote speaker of national renown is being programmed.

Ammonia Men Tell of Growth

A spot check of anhydrous ammonia sales for the January-May, 1956 period shows a 17.38 per cent increase as compared with the same months in 1955, the Agricultural Ammonia Institute reports.

Forty-seven distributor-members of the AAI in 25 states and one in Canada supplied information for the survey. They reported total sales of 30,471 tons for the five months, as compared with 25,958 tons for the same months in 1955.

"We are surprised at the results of this survey," Jack F. Criswell, executive vice president of the AAI said, "as we have received a number of adverse verbal reports this spring, and many national authorities are predicting lower fertilizer consumption for the 1955-56 fertilizer year."

He pointed out that similar ammonia surveys showed a 34 per cent increase in 1954, and 17 per cent in 1955—both of which proved to be conservative.

In this year's survey, 25 distributors reported increased sales; 21 reported decreases, and two said sales were about the same. Sales prospects for ammonia as sidedressing were reported as excellent by seven distributors, good by 22, fair by 12, and poor by five. Twenty-three of the distributors reported stepped-up advertising and promotion.

Approximately one-fifth of the nation's nitrogen fertilizer is now being applied as anhydrous ammonia by the direct application method. The 1955-56 tonnage is expected to reach 460,000.

Institute Offers New Color Movie

The National Plant Food Institute has added to its fine library of educational motion pictures a new one, entitled "What's in the bag?" which describes how commercial fertilizer is produced from primary raw material sources to the final, bagged, product. This is available without charge, but not always available on short notice. If you want to present it, try to give the Institute advance notice. If you want a complete catalog of Institute movies, write them for it at 1700 K. Street, N. W., Washington 6, D. C.

Mechanization for Profit Subject of Cotton Meet

The tenth annual Beltwide Cotton Mechanization Conference will be held at the Atlanta Biltmore, Atlanta, Ga., August 22-24. It will take a good look at the future of cotton, and the progress of farm technology on which that future rests.

Export Markets Subject Of Soybean Meeting

When the American Soybean Association meet on the University of Illinois Campus August 13-15, the major subject will be export markets for the soybean and its products. The new Soybean Council will be reported on. The whole objective will be to keep soybeans out of the surplus column—into which they have never yet fallen.

CFA to Stress Merchandising At 33rd Annual Convention

Meeting at the Hotel del Coronado November 11-13, the California Fertilizer Association will hold its thirty-third annual convention, with emphasis on fertilizer merchandising.

S. C. Educational Society Annual Meet September 6

The South Carolina Plant Food Educational Society will hold its annual fall convention at the Clemson House, Clemson, September 6, beginning at 1:30 p.m. These meetings are well attended by leaders in the field of agriculture throughout the Southeast.

B. R. Bertramson, Head, Agronomy Department, Washington State College, talking at banquet at Pacific Northwest Regional Fertilizer Conference, Yakima, Washington, June 27, 28 and 29, 1956.

PACIFIC NORTHWEST 7th ANNUAL MEETING—THE LARGEST EVER

The seventh Annual Pacific Northwest Regional Fertilizer Conference held at Yakima, Washington June 28-30 brought out the largest crowd in the history of this Conference, 257 being registered at the three day session. Thursday and Friday talks held attendance both days, with a banquet Thursday evening. Saturday morning there were machinery exhibits on display, both on solids and liquid fertilizers.

Portland, Oregon was set for the Conference in 1957, the dates being June 27-29.

The Board of directors of the Pacific Northwest Plant Food Association, sponsors of the Regional Fertilizer Conference, held a meeting during the conference, transacting necessary business .

Karl Baur, Pacific Supply Cooperative Association, Portland, Ore., was elected to the board of directors of the Plant Food Association to take the place of Robert Finch, resigned as he has left the area. Robert Allard, Wilbur Ellis Co., Seattle, was elected Treasurer, succeeding Mr. Finch.

Mr. Allard was also named General Convention Chairman for the 1956 Convention, which will be held November 7, 8 and 9th at Harrison Hot Springs Hotel, Harrison Hot Springs, Canada. Lee Fryer, of The Chas. H. Lilly Co., Seattle, was appointed Program Chairman. Both appointments were made by Frank Meeker, President of the Association.

The list of speakers and their subjects shows the well-balanced programming which is typical of this important regional conference;

June 28: L. A. Alban, Oregon State, reported on N tests on soils of the Columbia Basin wheat area; **J. P. Thorne,** Utah AES, told of Alfalfa response to sodium bicarbonate-soluble P_2O_5 in the soil; an analysis of forage crops in Idaho was given by **J. V. Jordan,** University of Idaho; **Kittams** and **Mortensen** of West Washington Experiment Station had a paper on the effect of nitrogen and potash on the yield and specific gravity of potatoes; a paper on the potassium supplying power of Oregon soils was prepared by **Pope** and **Cheney** of Oregon State; **Miller** and **Moodie,** Washington State, were authors of a discussion on the potassium fertility of western Washington soils;; **L. P. Batjer,** USDA, talked on tissue analysis of fruit trees; **I. E. Miles** talked on soil testing in the South.

Afternoon: H. J. Mack, Oregon State, discussed effects of nitrogen rates and stand levels on sweet corn yields at different moisture levels; **T. L. Jackson** of Oregon State had a paper on the effect of time and rate of nitrogen application on ryegrass seed production: a survey of nutrient levels in Washington soils was reported by **C. B. Harston,** Washington State; 13 years of soil testing in Idaho were the subject chosen by **C. G. Painter,** University of Idaho; **O. I. Dow,** Washington Irrigation Experiment Station, told of their work in the Columbia basin; a similar report on testing in western Washington was made by **L. G. Nelson,** of the Experiment Station in that area; **H. M. Reisenauer,** Washington State, finished the day with his presentation of molybdenum fertilization of eastern Washington crops.

June 29: H. D. Jacquot, McGregor Land & Livestock Co., discussed moisture efficiency of winter wheat as affected by nitrogen under adverse weather conditions; Correlation of available soil nitrogen, moisture and fertilizer requirements was chosen by **L. E. Warner,** Pendleton Grain Growers; **A. S. Hunter** and others of Oregon State prepared a paper on the effects of fertilizers on the yield and quality of dryland wheat in the Columbia Basin; **C. E. Nelson,** USDA, reported on effects of management practices on irrigated clover-orchardgrass pasture; **Mortensen** and **Kittams** presented a second paper, this time on comparison of liquid and dry forms of fertilizer with vegetable crops; **V. C. Bushnell,** US Interior Dept., related irrigation to soil fertility; and **June Roberts,** Washington State, discussed cost of fertilizer application.

Afternoon: R. Sprague told of revegetation of glacial denuded soils in Alaska; **H. Cheney** returned with paper on nitrogen forms and their behavior in the soil; **F. T. Tremblay,** Washington Cooperative Farmers Assn., spoke on fertilizer placement; **Dr. Emil Troug,** not present, sent a message to the assembly; **W. W. Arnold,** Nitrogen Division titled his talk "Now you can pour it on;" **C. S. Morrison,** Deere & Co., reported the farm industry's re-

sponse to the changing requirements in fertilizer application; **W. C. Hulburt,** USDA, told of special fertilizer equipment for field experiments.

Scholarship Awards Made

Two scholarship awards of the Pacific Northwest Plant Food Association were made last month to students at Oregon State College and Washington State College. The third award granted annually by the Association will be made at the University of Idaho in the fall.

Winner of the $400 award at Oregon State College was Paul Ediwin Heilman. Selection of the award winner was made by a combined committee of the Association and the Soils Department of Oregon State College; selection was based on scholarship, character, interest and potential ability in soils.

Winner of the award at Washington State College was David Mowat of Honolulu. Mr. Mowat has been interested in the sugar industry in Hawaii and has spent his summers on research work in that connection. Following graduation next year, he intends to enter a two year program of training offered by the Hawaiian Sugar Planters Association.

Pictures taken at Seventh Pacific Northwest Regional Fertilizer Conference, Yakia, Washington June 28, 29, 30, 1956.

Leon S. Jackson, Secretary of Pacific Northwest Plant Food Association and Norman Hibbert, Anaconda Copper Co., Yakima. Mr. Hibbert was in charge of local arrangements for Pacific Northwest Annual Regional Fertilizer Conference, Yakima, Washington June 28, 29 and 30, 1956.

Dr. Ray Neidig, Balfour, Guthrie & Co., San Francisco, S. W. Martin, Yakima Valley Spray Co., Yakima, assisting in local arrangements; also a director in Pacific Northwest Plant Food Association; Ben McCollum, vice President of the Pacific Northwest Plant Food Association.

Board Meeting Highlights

The Board meeting at Seattle June 13th discussed broadening out of the activities of the Association and placing the Association on a sound financial basis. Contributions of $1,000 each year for Farm Demonstration Projects and $300 for scholarships has dipped into Association funds. Therefore, the Board decided to raise its fees at both the Fertilizer Conference and the Annual Convention. Also an amendment will be presented to the membership at Yakima raising dues slightly.

A cost analysis survey was presented to the Board meeting and will come up for final decision at Yakima. As presented at Seattle, the benefit to be obtained would be to give the industry exact costs and inform the membership of the general average.

As a result of action taken by the Board last February, Lee Fryer reported he had been successful in his talks with Washington State College, whereby more Soil men would be placed in Experiment stations.

Plans are underway for Dealer's Day in the State of Washington as a result of the successful Oregon day last January.

WHAT MAKES SOIL TESTING "CLICK" IN SOUTH

by

I. E. Miles, *Agronomist**
Olin Mathieson Chemical Corporation
Jackson, Mississippi

During the last 20 years soil testing as a basis for a sound fertilization program has grown from a mere trickle into over a quarter million samples in the South, during the year of 1955. During the same time the agronomist in charge of the program has changed from a lone-voice in the wilderness with evangelical enthusiasm and often the love and respect of a quack doctor to a highly respected quasi-scientist who is rendering a real and genuine service to the farmers.

It has been of intense interest to those who have worked in this particular field from its very beginning to follow the evolution of the program and study some of the associated results.

Fertilizer consumption in the United States has grown from less than 8 million tons to almost three times that much. At the same time, the plant food content in mixed fertilizers have increased from less than 20% to about 27%. The use of actual nitrogen has increased from an average from less than 1.5 pounds for each acre of land in the United States to over 6.5 pounds. Phosphorus usage has increased from less than 3 pounds per acre to about 9.5 pounds. Potash usage has increased from less than 1.5 pounds per **acre** to over 7 pounds.

These higher rates of plant food usage, even though still **very** small, are more efficiently utilized now than the much smaller amounts were in the beginning of the period. It has been well established that fertilizer when efficiently used pays excellent profits. Since the over-all usage of fertilizer is still far below what is generally recommended by the experiment stations, it would seem fair to assume that the use of this additional plant food has made good money for the farmer. Actually, this is a known fact.

Though yields per acre is not an irrifutable index of profits it is usually a very good one. Since 1939 corn yields per acre have increased from 29 to 40, cotton yields from 238 pounds to 416 and wheat yields from 14 to 20 bushels per acres.

Obviously the soil testing program is only one of a number of factors that have caused the farmer to use more fertilizer, but it is certainly a very important factor in both encouraging the use of more fertilizer and in using it more efficiently.

Since this is true, a very pertinent question is, What is responsible for the relative success of the soil testing program? The supervisors of the soil testing service in the several states over the South were interrogated and have assisted very materially in formalizing the conclusions drawn on this matter. They are listed below, namely:

1. With the results of a good soil test, the supervising agronomist can make more specific lime and fertilizer recommendations for a given crop on a given piece of land than the general recommendations of the experiment station can possibly be.

2. A letter from the soil testing agronomist giving the results of the soil test and the recommendations for the use of lime and fertilizer is much more personal than general published recommendations.

3. Better equipment for testing soils is now available. This equipment is more accurate and more rapid than heretofore.

*Presented at the Pacific Northwest Conference.

4. The personnel both in the laboratory and those in charge are better paid, better trained and have more experience than in early days.

5. The successful soil testing agronomist is always enthusiastic about his program and of its value to the farmers.

6. The successful soil testing agronomist is always alert to keeping his methods and procedures correlated with the research results obtained from field plot tests.

7. The successful soil testing agronomist follows his recommendations in the field to see the success and failure and to find out the reasons for same.

8. The cost of production has increased so much, 2nd, the acreage of cash crops reduced so small, that the farmer must have maximum efficiency in production. He realized that testing his soils was a basic step in a sound fertilization program.

9. Demonstration plots, field test and whole farms have shown over and over that fertilizer recommendations based on a sound soil testing program have greatly increased efficiency in production. This has resulted in giving value, prestige and respect to the program and its leaders. Local leaders have recognized their work so as to place much greater emphasis on soil testing.

10. Governmental agencies and bankers realizing its value often require a soil test as a basic step in financing and assisting the farmer with his lime and fertilization program.

By way of summary, it is pretty generally agreed in the South, that soil testing is a very good tool in the hands of well trained personnel. It renders its greatest service where there is cooperation, understanding and mutual appreciation among the soil testing agronomist, research, fertilizer industry and local leadership on county and community level.

SUPERVISOR SAFETY TRAINING SCHOOL AUGUST 16-17

The Fertilizer Section of the National Safety Council has long recognized the need for a Supervisors' Training Program which would be helpful in implementing plant safety programs. A plan for just such a program is now a reality.

Under the guidance of W. C. Creel, Chief Safety Inspector of the North Carolina Department of Labor and Chairman of the Supervisory Training Program Committee of the Fertilizer Section of the National Safety Council, a Safety Training School for Supervisors has been planned for August 16th and 17th, at the Cape Fear Hotel, in Wilmington, North Carolina.

It will be the purpose to give those attending material and training which will be most useful in accident prevention work in their respective plants. The material to be used has been carefully screened in order that a "down-to-earth" approach might be given to this matter of safety. Records indicate that much good is now being done in the fertilizer industry safety-wise; however, there is much still to be done and through a training program such as this further reductions in accident losses can be made.

Mail a postal card on which you will note the number of representatives from your firm which you expect to attend this meeting. This card should be returned to Mr. Creel as promptly as possible in order that the number expecting to attend this meeting can be ascertained.

In order to secure funds to cover the necessary expenses a registration fee of $5.00 per person is being charged.

COUNCIL PUBLISHES SAFETY TALKS

A new volume of "Five-Minute Safety Talks for Foremen" has been published by the National Safety Council. Book 6, like the previous volumes, contains 52 talks designed to build sound attitudes on accident prevention.

Especially useful to foremen and supervisors, the five-minute talks provide ready-to-use outline and text for informal safety pep talks or scheduled training sessions.

The talks include material on general topics such as attitudes, lifting and first aid, as well as information on specific problems including the use of power actuated hand tools, masonry chipping, caustic chemicals, explosive dusts, flammable liquids, drills, saws and electricity. There are two talks on off-the-job safety.

For further information and prices, write the National Safety Council, 425 N. Michigan Ave., Chicago 11.

A. B. Pettit, recently named Director of Industrial Health for W. R. Grace & Co., launches the first company-wide safety campaign at a conference attended by 41 representatives from all Grace divisions. The two-day conference held in New York City earlier this week formulated plans for improved safety techniques in the company's diversified industrial operations in the United States, Latin America, Europe and Australia.

W. R. Grace Sets Up Company-Wide Safety Program

One hundred-and-two-year-old W. R. Grace & Co. which has diversified industrial operations in the United States, Latin America, Canada, Europe and Australia has inaugurated its first company-wide safety campaign designed to coordinate safety activities previously carried on independently by its divisions and subsidiaries.

Felix E. Larkin, vice president in charge of industrial relations has named A. B. Pettit as director of Industrial Health and Safety. Mr. Pettit was formerly Health and Safety Administrator for the company's Davison Chemical Company Division which has been awarded five National Safety Council awards of honor in the last six years under his guidance.

An industrial safety expert of broad experience, Mr. Pettit has frequently been called upon to participate in the investigation of many serious accidents, fires and explosions, the most widely known of which was the Texas City disaster.

The safety program was launched with a two-day safety conference attended by 41 representatives from all Grace divisions. Under the direction of Mr. Pettit the conference formulated plans for coordinating all safety programs and for the adoption of improved techniques and methods on a company-wide basis.

Canadian Plant Food Producers

HAVE RECORD ATTENDANCE AT 11TH ANNUAL CONVENTION

Plant nutrient problems vital to a profitable Canadian agriculture were discussed at the 11th annual convention of the Plant Food Producers of Eastern Canada at Mont Tremblant Lodge, Quebec July 4-7 before a record attendance of 250 members and guests from Canada and the U.S.A.

Speaking at the annual banquet on July 4, C. S. Barry, Director of the Production Service, Department of Agriculture, Ottawa, emphasized the growing importance of fertilizer problems in Canadian agriculture and the need for a very careful study of the provisions of the Fertilizer Act under which fertilizers are sold to farmers.

Dr. Russell Coleman, Executive Vice-President of the Plant Food Institute, Washington, D. C., in reviewing present fertilizer usage in the United States, emphasized that while consumption of actual plant food this year is no higher than last year, the fertilizer industry hopes to at least maintain and perhaps increase the use of plant food in the United States for the coming year. The industry in the United States has built more than adequate capacity to provide plant food, and after production capacity now under construction and committee are in production, the industry will have 25% to 50% more capacity than there is present demand for.

E. A. Taylor, Steel Company of Canada, retiring chairman of the Plant Food Producers of Eastern Canada, reviewed the progress made during the last year by the association and welcomed the new incoming executive, T. S. L. Pope, president of International Fertilizers, Quebec, and chairman for the coming year.

Dr. H. G. Dion, Dean of Agriculture, McGill University, MacDonald College, Quebec, speaking July 5, stated: "At present in Eastern Canada farmyard manure and commercial fertilizers are generally applied only to cereal crops. Grasslands usually get little or none of the plant nutrients that the farmer applies, except that used in seeding production per acre of grass, on down new stands. As a result, our which our mixed farming economy is built, is much too low, and not as profitable as it should be."

"However," continued Dr. Dion, "if farmyard manure is applied to hay and pasture fields instead, it will make a much larger profit for the farmer than when it is used on cereal crops, since farmyard manure apparently has a much greater effect on yields of grass than it does on cereals."

Dr. Dion pointed out that using farmyard manure on the grasslands would give longer lasting, more highly productive pastures than is general now, and would, in fact, give forage crops the property of greatly improving soil fertility for the following cereal crops—a property that forage crops should have, but rarely do, in Eastern Canada today.

"The tired sods that are plowed when they are no longer productive contribute little to the fertility of the farm," said the Dean.

"Such a change in farm practice" he stated, "would mean, in addition to more and better forage per acre, nearly weed-free corn and oat crops, with less lodging and delayed maturity. It would be accomplished through the use on cereal crops of commercial fertilizers at considerably higher levels of application than are the rule today, when cereals get most of their needs from farmyard manure, while grassland gets little or nothing."

More attention is needed to supplying **all** the mineral elements required by crops was a major point emphasized by **Dr. Firman E. Bear** of Rutgers University, New Jersey, speaking July 5 on the subject of "Meeting the Mineral Needs of Plants."

"The value of lime in the soil," Dr. Bear pointed out, "is not confined to correcting soil acidity, but also for supplying calcium and magnesium." Overliming, however, he stated, tends to cause a deficiency of trace elements, the exception being molybdenum, which is supplied more hceifly as molybdate than by extra liming.

"Soil exchange values should be made up of about 20% hydrogen (pH 6.5), 65% calcium, 10% magnesium, and 5% potassium," continued Dr. Bear. Alfalfa, he pointed out, on such soil will contain around 165 me. total cations per 100 grams dry weight. Of these, 90 will be calcium, 35 magnesium and 40 potassium. If potassium is higher, magnesium may be deficient. If lower, stand will not persist.

"For dependably high yields," proceeded Dr. Bear, "crops must be able to accumulate about 150 lbs. of nitrogen, 50 lbs. of phosphoric acid, and 150 lbs. of potassium. Because of high fixing power of soil for phosphoric acid, that value must be multiplied by about 3. This calls for 15 tons phosphated manure or 1,500 lbs. 10-10-10 per acre.

In conclusion, Dr. Bear stressed that other important concepts for the grower to consider are: Ammonium versus nitrate in relation to other nutrients, fertilizing the crop versus the soil, using **chelated** iron, developing soil test-servicing program, keeping off the land as much as possible, growing fertilized sod or cover crops to plough under, and developing deeper root systems for greater drought resistance.

The purchase of commercial fertilizers should be regarded as an investment in which all the factors involved must be studied as carefully as when investing in bonds, stocks and real estate, stated **Dr. R. P. Pennington,** Manager for Canada, American Potash Institute, Burlington, Ontario, July 7.

"Fertilizers should be purchased and recommended in such a way," continued Dr. Pennington, "that their use will give the greatest possible return from the investment, rather than being purchased so as to cut the cost of fertilizers to a minimum. This fact, he stated, should be impressed upon farmers, agricultural research and extension personnel and bankers. When this is accomplished, the use of commercial fertilizers will be increased

to the benefit of both the farmer and the general public."

Dr. Pennington emphasized that fertilizers used in this way may not increase the total production of any crop. It will mean however, that crops will be produced at the lowest per-unit cost, and the farmer enabled to make a reasonable profit.

Such use of fertilizers, he pointed out, will in most cases enable the farmer to decrease the number of acres he has in any one crop, without decreasing his total production. This will give him the opportunity to diversify his operation without increasing his capital investment in land. In order to do this job, fertilizers must be used properly along with other factors involved in crop production.

Dr. Pennington concluded that this involves a knowledge of soils, proper use of lime, varities, planting rates and other sound management practices, including the use of herbicides and insecticides where required.

J. M. Appleton, President, Greenmelk Company, Wallaceburg, Ontario, emphasized July 7 the important role of grass in modern farming.

"In most agricultural soils, the destruction of soil is a serious problem," said Mr. Appleton, "but it can be significantly controlled by the use of grass, efficiently managed and adequately fertilized." The speaker added that grass, itself, was a profitable cash crop as well.

It was stated, by Mr. Appleton, that as North American agriculture changes from the extensive to the intensive farm system, grass will become an essential part of the rotation. "Grasses sown alone ,adequately fertilized and irrigated, offer great potentials to the well-organized intensive farm system," he said. "And they can be easily supplemented with legumes."

"Modern mechanization makes possible the best use of grass through an intensive livestock feeding programme," added Mr. Appleton. "With modern self-feeding, silos and hay bunks, one man can look after 500 steers. And the electric fence, mower and irrigation unit help to make 1000 pounds of beef per acre a possibility."

"Grass contributes to the soil structure as well as providing a profitable cash crop . . . indeed, agronomically, it forms the basis of a complete farm cycle," concluded the speaker.

Southern Control Officials Elect R. W. Ludwick

One of the most successful and best-attended meetings of the Association of Southern Feed and Fertilizer Control Officials was brought to a close at Roanoke, Virginia, with the election of officers and recognition of the past president on Friday night, June 29. This was the fourteenth annual convention of the group.

President M. P. Etheredge presided during the meeting attended by sixty control officials and fifty-five representatives from industry.

The new officers are as follows:

President: R. W. Ludwick, deputy in charge, Feed and Fertilizer Control Office, State College, N. M.

Vice President: Dr. E. W. Constable, state chemist, Department of Agriculture, Raleigh, N. C.

Secretary-Treasurer: Bruce Poundstone, head, Department of Feed and Fertilizer, Kentucky Agricultural Experiment Station, Lexington, Ky.

Bruce Cloaninger, head, Department of Fertilizer Inspection and Analysis, Clemson, S. C., was selected chairman of Executive Committee. The members of the Executive Committee include the three officers already named along with Mr. Cloaninger and M. P. Etheredge, State College, Mississippi, retiring president; Harold H. Hoffman, Florida State Department of Agriculture, Tallahassee, Fla.; L. C. Jacobs, Tennessee Department of Agriculture, Nashville, Tenn.; and Maurice Rowe, Division of Chemistry and Foods, Virginia Department of Agriculture and Immigration, Richmond, Va.

A special feature of the meeting included a banquet on Thursday night at which W. C. Jacobsen, director of Department of Agriculture, Sacramento, Calif., and president of the National Association of Commissioners, Secretaries and Directors of Agriculture, was the principal speaker. A tour of the new Lindsey-Robinson Feed Mill was enjoyed by the group on Friday afternoon.

Next year's meeting, the fifteenth annual meeting of the Association, is tentatively scheduled for June 17, 18 and 19 in Birmingham, Ala.

The Soil As A Factory

by H. L. Dunton, *Head, Agronomy Department*
Virginia Polytechnic Institute, Blacksburg, Va.

The fertilizer program in Virginia, until recent years, endeavored to, first, show the farmer that plant food, or fertilizer, is essential on practically all soils in Virginia for efficient crop production. I believe this has been fairly well accomplished. The second step endeavored to get more nearly the correct amount of fertilizer used, which meant that the program was built more around the idea of getting some fertilizer used and not as much on the consideration of the right kind and amount. I feel that these steps were necessary and, perhaps, the soundest that could have been taken at that time, because practically all soils were deficient in plant food for efficient crop production.

Today, on many farms the situation is quite different. We must use what we use and any increase more efficiently. What I will have to say may create more problems for the Control officials and the industry and the college since it will mean that more grades will likely be used on each farm. In other words, the old idea of one grade or analysis of fertilizer for corn has passed. I am firmly convinced that if we survey any area in a county, we will find that there are situations in which practically every grade of fertilizer on our present list should be used.

Today, what do we consider in trying to make a fertilizer recommendation? First, the soil.

We consider the soil as the manufacturing plant for crop production in agriculture. The soil, as a manufacturing plant, can be compared with industrial plants and there are many similarities. We have wide differences in soils as we have many different kinds of industrial plants. However, there are, in my opinion, two big differences between the soil as an agricultural manufacturing

Given before 14th Annual Convention of the Association of Southern Feed and Fertilizer Control Officials at Roanoke, Va., June 29, 1956.

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Middletown, Ohio • Richmond, Va.

plant and the industrial plant. First, I feel that the soil is more complicated and harder to understand; and, secondly, the soil is the only manufacturing plant I know that improves with use if properly managed. All others deteriorate with time, regardless of how well they are managed.

Soils do vary widely in their characteristics and abilities to produce. These facts must be taken into consideration. We must learn more about the soil and we are spending, at our Institution and in other institutions in this Southland, a lot of money studying the characteristics of this manufacturing plant, the soil. As an example, we now have two well-trained men in our department, who are studying and characterizing the colloids in the different soils of Virginia. I may add that they are finding some most interesting facts relative to this. Due to certain types of colloids in a particular soil, they are finding that this soil doesn't lose plant nutrients by leaching as rapidly as another soil. Another example of considerable interest is the fact that we are now producing alfalfa, and have been for three years, on a soil with a pH of 5.6. A few years back, we would have said this could not be done. As we study this soil further, we may find it is not necessary to raise the pH as high as it is on some other soils in order to grow alfalfa successfully. Therefore, we expect to continue, as rapidly as feasible, to look into these different soils and to find out more about them.

We must recognize that certain soils have limited capabilities and, therefore, cannot produce good returns on large amounts of fertilizer. In other words, if we consider fertilizer as the raw material going into the manufacturing plant, the soil, then we readily see that certain soils cannot use as much fertilizer efficiently as certain other soils. This may be due to many reasons, which we cannot go into at this time.

The soil, we feel, must be considered carefully in any program of efficient fertilization.

The second major consideration in making an efficient or good fertilizer recommendation is the past treatment of the soil. Is this soil in a high or low state of production? Has it been producing alfalfa, or pasture, or continuous corn or just what? If we know the past treatment and the effect of that treatment on the soil, it will help make a more accurate recommendation for fertilization.

The third consideration is the soil test. We test approximately 50,000 samples of soil per year in Virginia. We use the soil test results as an aid in determining fertility level and fertilizer needs, but not as the sole factor in making fertilizer recommendation and, I am sure, this is a mistake. However, if the soil test is properly interpreted it can be an aid in making a good recommendation.

The next major consideration, in making the fertilizer recommendation, is the crop to be grown. Different crops have different requirements. I can illustrate what I am trying to say by describing a recent visit to a farm. The fertilizer for spring use had been purchased. Tobacco, alfalfa, corn, pasture and millet were being fertilized in the spring. One analysis of fertilizer had been purchased. Yes, it was a tobacco grade and analysis. This same grade and analysis was being, or going to be, used for all crops. We made a study of the soils, the past treatments and tested the soils on this farm and our recommendations would have included not one grade or analysis, but six grades and analyses, in order for this man to have fertilized most efficiently, and, we felt, to secure the best results from the money invested. This, I recognize is a rather extreme case, but I am afraid we would find cases that, at least, resemble this on many farms.

I was quite pleased when I visited another farm, not ten miles from this farm, which was growing essentially the same crops and he had six different analyses of fertilizer for these crops. He had studied carefully the situation on his farm and had tried to purchase the grade or analysis that he felt was best for each crop and situation.

In order to make a good fertilizer recommendation, we need to consider the economic conditions generally and on the individual farm. This is a most important consideration.

Finally, we have reached the point where it is necessary to consider what variety of a particular crop is going to be grown before we make the recommendation. We know, today, that different varieties of tobacco should be fertilized differently on the same soil and under the same general conditions. We are developing varieties of other crops that respond differently to fertilization. As we develop more and better varieties, this will become of even greater importance.

The farmer must consider all factors concerned in efficient fertilization if he expects to compete successfully and stay in the business today.

NEW BOARD TAKES V-C CONTROL

Following a 3 month proxy fight, the independent stockholders' committee headed by Rupert T. Zickl, New York investor, at a special meeting in Richmond, Va., July 18, won control of Virginia-Carolina Chemical Corp. from the established management.

The gorup replaced 6 incumbent directors and removed Joseph A. Howell as president. It named 6 of its nominees, including former Virginia Governor John S. Battle, to the board.

The new Board of Directors named as temporary president William C. Franklin, president, Royal Crown Bottling Co. of Baltimore and Washington, to guide the firm until a new chief executive is chosen. Acting as spokesman for the group, Mr. Battle said the selection of a new president will be done "with reasonable promptness in the next few weeks we hope."

Mr. Battle said further that the "new management had no idea of terminating the services of loyal employees; any employee doing his job well will be recognized as such."

Mr. Howell, whose employment contract with V-C does not expire until 1963, said that he expected to serve V-C stockholders for some time to come. He has been with the 61-year-old firm for 35 years.

INDUSTRY CALENDAR

Date	Organization	Place	City
Aug. 30	S. C. P. F. E. S.	Clemson House	Clemson, S. C.
Oct. 18-19	Control Officials Assn.	Shoreham	Washington, D. C.
Oct. 21-22	Fert. Safety Section	LaSalle	Chicago, Ill.
Oct. 26	Middle West Soil	Edgewater Beach	Chicago, Ill.
Nov. 2	Sou. Soil Conf.	Atlanta Biltmore	Atlanta, Ga.
Nov. 7-9	Agric. Ammonia Inst.	Atlanta Biltmore	Atlanta, Ga.
Nov. 11-13	Calif. Fert. Assn.	Coronado	Coronado, Cal.

Fertilizer Solves Farm Problems*

by Russell Coleman
Executive Vice-president
National Plant Food Council

Our present farm dilemma seems to consist of two principal problems: (1) To maintain net farm income and (2) to dispose of surplus farm commodities. Actually there is a third problem often forgotten but perhaps of even greater importance; that is, to maintain our nation's soil productivity. The first two problems are probably short-term ones. Maintaining soil productivity, however, is a problem which will face our nation for a long time. We must remember that America can stay strong only so long as its soils remain productive.

What place does commercial fertilizer have in solving these problems? This is a question with which I am often confronted. I am sure that you as fertilizer control officials are also asked the same question.

I shall, therefore, attempt to present a logical answer by relating fertilizer to each of the three problems listed above. Let us take a first look at the relationship of fertilizer to our soil productivity problem. Recent research by agronomists suggests that commercial fertilizer may play a new and vital role in restoring and maintaining soil productivity.

I should like to use experimental results from the two oldest experimental plots in the United States to illustrate this point. The Morrow Plots at the University of Illinois, established in 1876, were revised in 1955 to determine whether adequate plant food applied in one year could restore the productivity of a soil depleted over seventy-nine years with intensive cropping. The results in Table 1 show yield comparisons from the corn-oats-legume rotation. Although under this type of cropping soil depletion is slow, the data show that adequate plant food applied in one year (1955) produced as much corn as the best rotation system which had received fertilizer for the fifty previous years.

The Jordan Plots at Pennsylvania State University confirm the above results. In Table 2, comparing definite fertilizer treatments in the corn-oats-wheat-hay rotation, the results show that soil with adequate fertilizer applied only in 1953 produced as much corn that year as a similar soil fertilized during a previous twenty-one year period. The productivity of the soil seems to have been restored in one year with plant food even though it had been depleted for many prior years.

The results from the Morrow Plots led Dr. M. B. Russell, Head of the Agronomy Department, University of Illinois, to conclude that "yield differences associated with previous management practices largely were removed by the application of liberal amounts of plant food." This conclusion has generally been confirmed by recent results from experiments at the University of Missouri and North Carolina State College.

These data from long-time experiments throw a new light on the value of plant food in maintaining the productivity of our soil. It appears from these results that plant food applied in adequate amounts may be able to restore the productivity of soils previously considered unproductive. Plant Food will, therefore, play an ever increasing role in protecting the nation's most important resource—our soil productivity.

Now let's turn our attention to the short-term twin problems of disposing of farm surpluses and increasing the farmer's income. What can plant food do to help solve these "headaches?"

A number of state experiment stations have shown recently that by using fertilizer to produce more per acre, the cost of producing each unit can be reduced. In this way farmers can realize more net return from the farm products which they sell. Using state experiment station data as a basis, our staff in collaboration with USDA personnel has projected the effect of proper fertilization and soil management upon net farm income and its concurrent impact upon the surplus problem.

In Table 3 is projected a picture of what could happen if all the corn in the United States were grown according to the best known research techniques, including the proper use of fertilizer. Two basic assumptions were made in developing these figures. First, it was presumed that our nation would produce no more of a farm commodity than it could use. Second, it was assumed that our yields per acre of farm crops would be grown under the best management. The projected figures show that our nation's average corn yield could be increased from 37 to 70 bushels per acre; that our nation's needed corn supply could thus be grown on less than half the acres devoted to this crop. By increasing the per acre yield, the average cost of producing each

*Presented to the Association of Southern Feed and Fertilizer Control Officials, Roanoke, Virginia, June 28, 1956.

Can Soil Productivity be Restored in One Year?

Table 1—Morrow Plots, 1876-1955
University of Illinois

CORN-OATS-LEGUME ROTATION Treatment	1955 Corn Yield Bu/Acre
No Fertilizer for 80 Years	63
Same for 79 Years, but fertilized* in 1955	102
No Fertilizer First 29 Years, MLP** 50 Years, Plus fertilizer in 1955	101

*Treatment in 1955: N—100; P_2O_5—150; K_2O—100
Unlimited plots received 5 tons limestone.
**Manure, lime, rockphosphate.

Table 2—Jordan Plots, 1881-1953
Pennsylvania State University

1931-1952 Corn Yield Bu/Acre	Corn-Oats-Wheat-Hay Rotation Treatment	1953 Corn Yield Bu/Acre
28.3	No Fertilizer for 73 Years	36.2
---	*Fertilized 1953 only	86.6
67.3	**N-P-K for 72 Years	84.9
---	Same, Plus Fertilizer in 1953	85.5

* Treatment in 1953: N-P-K according to soil tests, and past history of plots.
**Treatment for 72 years: N—72; P_2O_5—48; K_2O—100

PROGRESS REPORT TO INDUSTRY AND AGRICULTURE

what TRONA® *is doing about* Quality Control

FILE ROOM OF TEN-THOUSAND SHIPMENTS. Actual product samples of Trona domestic shipments are held in reserve for three months, export shipments six months, as a special customer service and to provide individual quality maintenance.

Continuous monitoring means more than 400,000 separate quality determinations per month

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Why not give your own products the benefits of the built-in *and controlled* quality of Trona's broad line of basic chemicals for farm and factory?

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bushel could be lowered from $1.00 to 80c. Thus the profit from each bushel and from each acre could be increased. Although it is difficult to estimate the total net profit from all corn grown in the United States, it does appear that by following this practice of using adequate fertilizers to increase per acre yield, more total profit could be realized from fewer bushels of corn than are now grown.

The same practice applies to cotton. Our nation's cotton yields could be increased from 339 pounds of lint to 520 pounds by proper fertilization in combination with other good practices. Thus our nation's cotton needs could be produced on about one-half the acres currently devoted to that crop. By increasing per acre yields, the average cost of producing cotton could be reduced from 28c per pound to 20c. Thus the average profit per pound and per acre could be increased materially. Thus cotton grown under the best management practices could actually yield America's farmers more net dollars from fewer bales than are currently produced.

Although this information may be academic, it does illustrate what I believe is a sound principle; namely, that proper plant food applications could be used to increase net farm income and at the same time could contribute toward solving our surplus problem.

Our plant food industry thus has an essential role regardless of the farm problem. It can be used to improve and restore soil productivity or it can be used to improve the net farm income picture without contributing to the agricultural surplus problem.

You, the State Control officials, play a most important part in keeping our industry healthy. We look to you to continue to exert leadership and to help our industry meet its obligation to our nation.

Table 3—Corn Profits can be Increased from Less Production on fewer acres in the United States[1]

Practice	Acreage	Total Production Bushels	Profit Per Acre[2]	Total Profits On All Acres[2] Million Dollars
Current Production Practices	80,000,000	3,000,000,000	$14.80[3]	$1184[3]
Recommended Production Practices	35,700,000	2,500,000,000	$42.00[4]	$1499[4]

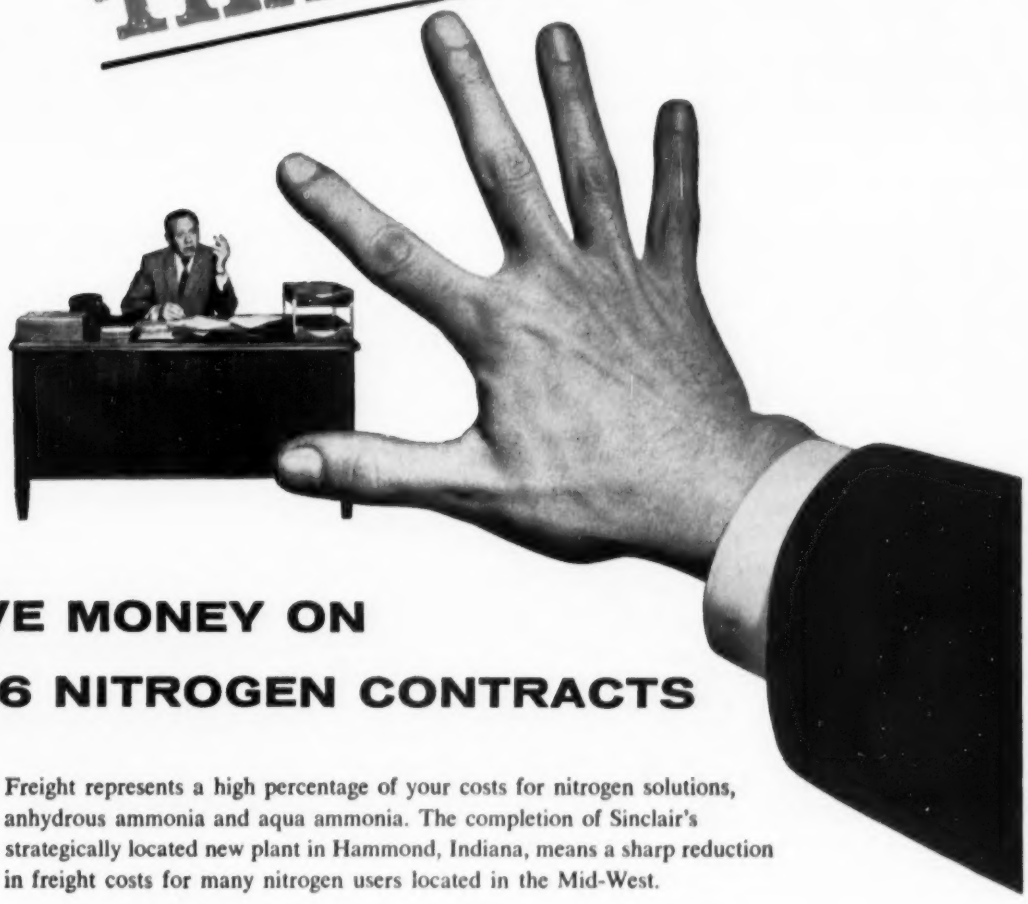
[1]These figures are estimates prepared by the National Plant Food Institute with the cooperation of the U. S. Dept. of Agriculture.
[2]Corn valued @ $1.40 per bu.
[3]Calculated on average yield 37 bu.; average cost $1.00 per bu.
[4]Calculated on average yield 70 bu.; average cost $.80 per bu.

Table 4—Cotton Profits can be Increased from less Production on fewer acres in the United States[1]

Practice	Acreage	Total Production Bushels	Profit Per Acre[2]	Total Profits On All Acres[2] Million Dollars
Current Production Practices	20,000,000	6,800,000,000	$10.17[3]	$203[3]
Recommended Production Practices	10,400,000	5,400,000,000	$46.80[4]	$487[4]

[1]These figures are estimates prepared by the National Plant Food Institute with the cooperation of the U. S. Dept. of Agriculture.
[2]Cotton valued @ $.314 per lb.
[3]Calculated on average yield of 339 lbs.; average cost $.28 per lb.
[4]Calculated on average yield of 520 lbs.; average cost $.22 per lb.

DON'T SIGN THAT ORDER!



SAVE MONEY ON 1956 NITROGEN CONTRACTS

Freight represents a high percentage of your costs for nitrogen solutions, anhydrous ammonia and aqua ammonia. The completion of Sinclair's strategically located new plant in Hammond, Indiana, means a sharp reduction in freight costs for many nitrogen users located in the Mid-West.

Here's another big advantage! Sinclair's new facilities and vast new storage capacity make it possible to meet *your* production schedule – even during peak season. Two tank car fleets are held in readiness – one for exclusive use in shipping anhydrous ammonia, the other for nitrogen solutions.

So don't sign that contract... first find out how this new Sinclair plant in the heart of the Mid-West can cut your costs and delivery time of nitrogen supplies. Write or telephone...

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155 North Wacker Drive, Chicago 6, Illinois – Phone Financial 6-5900

Hale and Hardy are, respectively, the new president and the executive director of the Tennessee Agricultural Council . . . our congratulations to the make-up man on "Cotton Gin and Oil Mill Press" who wrote the headline "Hale and Hardy to Head Agricultural Council."

●

$64,400,000 was our 1955 export of fertilizers, as compared with $39,400,000 in '54 and $29,800,000 in '52. No wonder we find that Britain's farmers are using record quantities of "fertiliser" as they spell it, and that the consumption of South Africa is on a steady upward trend.

●

Lifeblood. Western papers gave quite a play to the talk Logan Carter of Polytech made at the Riverside conference. "You don't have to sell fertilizers to row-crop and fruit farmers in California" they led off . . . but "dry-land farmers are slow to accept fertilizer, although the value of its use has been proved repeatedly. Typical head on a report of this meeting: "Commercial Fertilizer is Agriculture's Lifeblood.

The article tells how Logan Carter, head of the soils department, California State Polytechnic College, did a bang-up job of telling some 200 persons attending the conference how 300 pounds per acre of 16-20-0 on rangeland, once in three years, gave students a net profit of more than $5 per acre per year over unfertilized range.

The fertilizer range was ready to pasture four to six weeks earlier in the spring, which is a critical time for feed; it was less weedy, feed utilization was better because the forage was grazed uniformly, not in patches, and best of all, the steers off the fertilized ranges made the most money in the feed lots. "In fact," he said, "the steers from the fertilized range were the only ones that made any money in the feed lot last year."

Colored slides accompanying his presentation made it very easy to see the difference in growth and color between the fertilized and check pastures, which received none. "I've been accused of drilling a grain crop in the fertilized pastures," Carter said, and it certainly appeared that way, although we were assured that it was only fertilizer that made the difference. The range growth was ordinary annual grasses and the material was simply applied in dry form, with an ordinary spreader, on top of the ground preceding winter rains.

"There are 6,000,000 to 10,000,000 acres of rangeland in California on which fertilizer would be a profitable investment," Carter said. "Where the rainfall equals 12 inches annually, it is a paying proposition."

RESEARCH RESULTS & REPORTS

●

Trace minerals have proven themselves of economic importance in tests covering two years in South Texas. The research was conducted by the Southwest Foundation for Research and Education, on the famed King Ranch and elsewhere in the region. They find that treading the soil with molybdenum, copper and zinc stimulates the growth of legumes and that is why they consider it of economic importance to the area. Yield increases range from 10-15% to some exceptional cases where it has been as high as 40%. All this is a preliminary report, based on performance on small plots. They are extending the research to larger fields.

●

15,000,000 acres in the soil bank is the USDA hope for this year. Corn, wheat, cotton, peanuts and rice expectations are in this figure, in that order.

●

Day to day information goes to Connecticut growers on the probable spread of plant diseases. Thus they spray only when they need to, because the AES keeps them abreast of conditions. The AES puts together data on rain, air movement and many other factors that cause disease spread . . . and the result is a forecast that farmers there have learned can be depended upon.

●

Liquid on lawns. Out in the midwest there seems to be a development toward the use of liquid fertilizers on lawns. The custom lawn sprayers put it on, and put herbicides on at the same time, if needed. Thus the plant food helps the grasses fight the weeds, and the herbicide helps do the rest. The result could be a pretty fine lawn.

●

Fish ponds. We are impressed with the fact that the newspapers around the country never seem to be tired of telling their readers that fish ponds need fertilizer, to get a good "crop" of fish out of them. Not surprising, perhaps, when you know how many anglers there are in this world. So if the newspapers can keep on plugging this, the least the industry can do is to back them up with fish-pond-fertilizer salesmanship. Something to do in the Summertime!

●

Anniversary. Last month was the 39th anniversary of the legislation that laid the foundation for USDA research and educational work with farmer cooperatives—and the USDA duly celebrated the occasion.

Today Farmer Cooperative Service works with farmers who belong to 10,000 cooperatives. There are 3,000,000 such farmers, doing a net volume of business of more than $9,500,000,000. The year before the legislation was passed—1925—their total business was $2,500,000. Farmer interest in cooperatives adds up now to $1,800,000,000. Two of those figures are Billions, not mere millions.

●

4-10-7 will continue to be sold in Alabama, for another year, despite the recent recommendation of the Auburn AES. The State Board of Agriculture unanimously voted to extend the sale after a stormy 3-hour session, attended by 100 fertilizer manufacturers and dealers. But the Board voted to take off the approved list, as of October 1 both 6-8-4 and 5-10-5.

The story back of this is that the AES reported that while 4-10-7 and 6-8-4 represented 79% of sales in Alabama, only 8% of the farms need this type of fertilizer.

●

Grocery sales of manure are the startling report from Ontario. Up there a man is using his alfalfa dehydrator to make a concentrated manure. He packs it in 3-pound bags, nicely decorated with a suitable picture . . . and has more orders than he can handle from grocery stores who sell it over the counter.

CHANGES

Olin Mathieson has expanded its technical service department to incorporate responsibilities formerly grouped under the market development department (See Personals).

—CF—

International Paper has reorganized its sales department, dividing the country into four sales regions, each with a regional sales manager reporting directly to Divisional Sales Manager **R. R. Worthington**. (See Personals)

—CF—

Dorr-Oliver has reorganized its sales department so that Line Sales shares equal broad responsibilities with Sales Services, shortening and making more flexible the lines of communication. Industrial Sales now consists of six, instead of the previous three, divisions. New divisions are: Southeast, Atlanta; South Central, Dallas; Mountain, Englewood near Denver. (See Personals)

—CF—

Earle's & Shores Chemical of Kansas City has opened a branch at Wichita, for the distribution of crop and industrial chemicals.

United States Borax & Chemical Corp. formation has now been assured by the vote of stockholders, joining **US Potash** with **Pacific Coast Borax.** Progress of these moves has been reported here for the past two months.

(See page 72)

—CF—

Union Bag-Camp Paper Corp. came into being following overwhelming stockholder approval, and is a merger of **Union Bag & Paper** and **Camp Manufacturing Co., Inc.,** as reported here last month.

—CF—

Stauffer and **West End Chemical** boards have approved a plan to merge West End into Stauffer, and will shortly submit the plan to stockholders. West End produces borax, soda ash, salt cake, and lime at Searles Lake, California. For more than 25 years, Stauffer has been exclusive sales agent for West End's borax. The plan anticipates autonomous operation of West End, under the name "West End Chemical Company Division of Stauffer Chemical Company."

SHOWMANSHIP IN FERTILIZER SALES

A 68 car train load of chemical plant food recently rolled into Omaha, Neb., on the "Wheat Belt Special." It is listed as the largest single shipment ever to enter Nebraska—and for all we know may be the largest single shipment of its kind.

But what went on behind the scenes of this shipment is a point we would like to stress: 27 dealers who ordered the fertilizer were flown to the Olin Mathieson plant at Houston, where they watched the production of the Ammo-Phos, from the raw materials to the loading aboard the train.

They were flown back to Omaha, so as to be present at the train's arrival, and to participate in a welcoming ceremony held at the freight station. And then they were guests at an Olin Mathieson dinner.

Nor did Olin Mathieson miss pointing out to the local press what this shipment means to the economy of the area. Said Omaha district manager S. Y. Roth:

"The increasing use of fertilizer in the state means that despite adversities, farmers are continuing to plan to make the best use of their land.

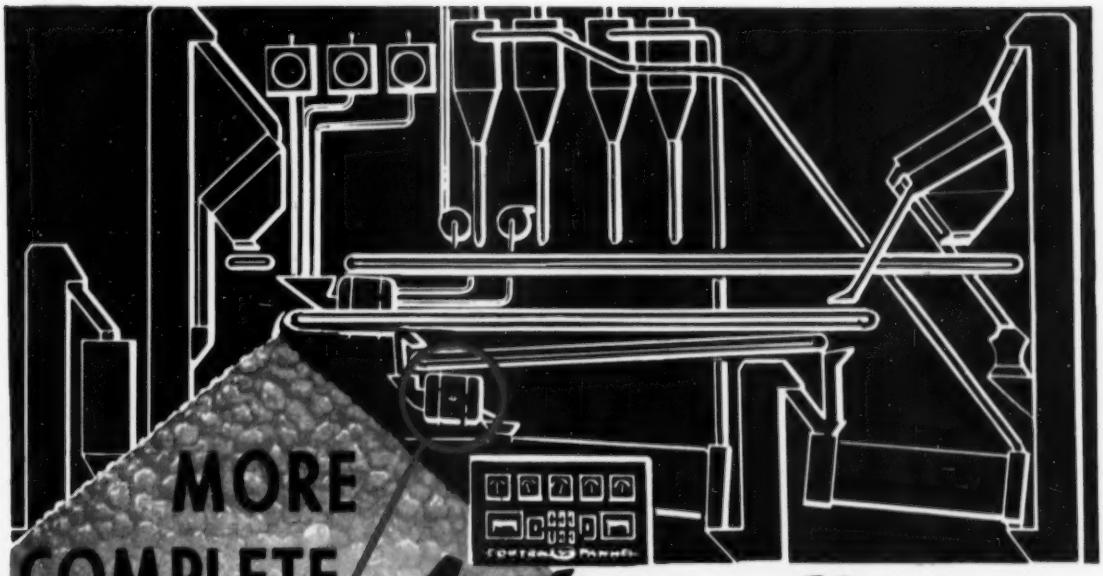
"With twenty per cent of Nebraska's income derived from agriculture, and a third of our population directly dependent on agriculture, anything that increases farm income has a tremendous and immediate effect on every person in the state.

"They know that the use of these up-to-date practices is one of the surest ways a farmer can increase his income because higher yields reduce unit costs of production."

"While in Houston, the Amo-Phos dealers were guests at a dinner attended by Gulf Coast agricultural and business leaders. They visited industrial and civic spots of interest in and near the city.

"The Olin Mathieson plant which they visited, manufacturing high analysis, pelletized fertilizer, is one of the largest fertilizer plants in the world. It is also the pioneer U. S. plant of its type.

"Olin Mathieson operates an insecticides plant in Omaha and an irrigation assembly plant and warehouse at Grand Island. The Plant Food Division's district office here (4616 Dodge Street) serves an 8-state area."



MORE COMPLETE *Automation* IN *Granular*

MIXED GOODS PROCESSING WITH SACKETT "TUNED TO THE TREND" METHODS

Even before the turn of the century, the Sackett Organization was busily engaged in blazing new production trails, many of which have since been followed and accepted as manufacturing standards by the Ferlilizer Industry. The fact that our interest in pioneering, over the years, has not lessened is borne out by the fact that the Sackett Organization holds more patents on fertilizer production equipment and methods than all other such manufacturers combined. The late link in this ceaseless effort is the Sackett STAR* Granulator, which is now on the threshold of revolutionizing all existing methods of granulating fertilizers.

Established fertilizer producers are invited to get our up-to-the-minute counsel on their conversion and expansion programs. It is available without cost.

*U. S. and Foreign Patents Pending

THE A. J. SACKETT AND SONS COMPANY
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RELATED PRODUCTION EQUIPMENT

CONVERSION TO GRANULATION WITHOUT EXTENSIVE CHANGES TO BUILDING AT WISCONSIN FARMCO PLANT IN WHITEWATER

To meet the ever increasing demands for granular fertilizer, Wisconsin Farmco Service Co-op installed the "FEECO" Granulation Process in their Whitewater Plant. The entire operation includes automatic feed of dry and solid raw materials, continuous ammoniation, agglomeration and product sizing equipment. By virture of the automatic feed in combination with continuous ammoniation, savings in production costs are expected.

Modification of the existing building to accommodate the new equipment was accomplished with a minimum number of changes. Actually, the building structure remained unchanged except for supporting beams placed under equipment that was installed in the existing mill tower.

During the initial planning stage, it was decided to utilize a small storage bay on the ground floor level of the mill tower. Because of height limitations the cooler drum trunnion base was placed below the main floor level with the cooler discharging into a 7' elevator pit. However, the main building foundation was not supported on firm soil and because of structural conditions, the elevator pit could not be made deeper than 4 feet. This presented the problem of maintaining proper discharge slope into the elevator.

Additional height gained by using a retaining ring and lifting flights at the discharge end of the cooler eliminated the problem.

Additional process machinery furnished by the Fertilizer Engineering & Equipment Company, Inc., of Green Bay, Wisc., was placed at higher elevations without any changes of existing equipment. The process was changed from a batch-type operation to continuous-feed by using a surge hopper and a vibrating weight feeder, together with continuous flow meters and controls for solutions. Existing elevators, screens, pulverizers and conveying equipment for the raw materials feeding system were not changed.

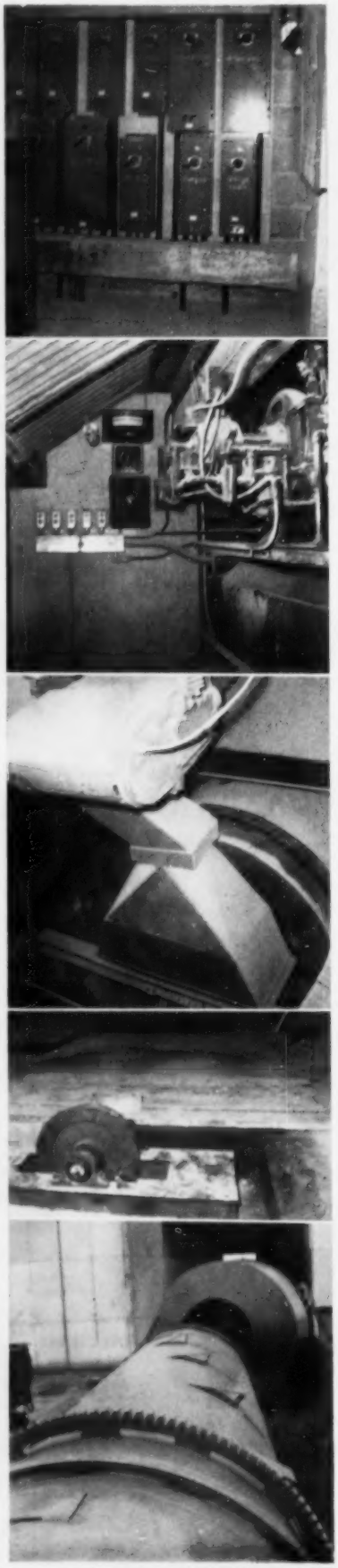
The dry materials and liquids are automatically controlled and combined in the TVA type ammoniator. From the ammoniator the mix is routed to the drier and cooler drums, or with normal grades, is bypassed to storage for curing.

Although limited to the use of only one shuttle belt, any two operations such as basing and bagging, or bagging and unloading raw materials, can be accomplished simultaneously, by utilizing a transfer bay for temporary storage. This innovation allows complete flexibility, and assures that a necessary operation will not be held up because of limited handling and conveying equipment.

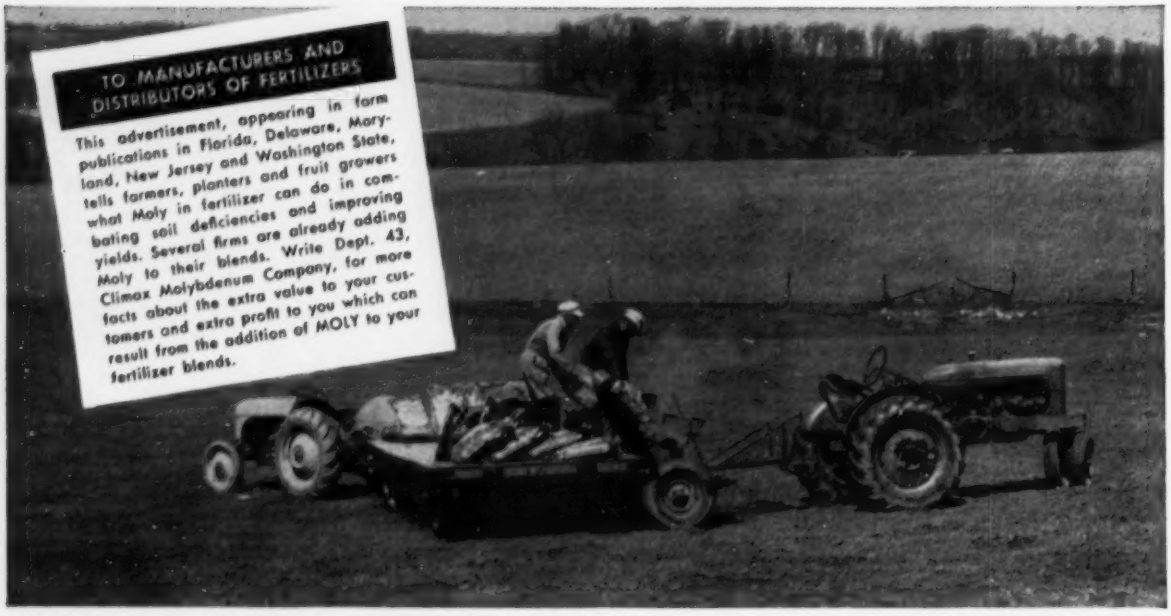
Mixing of the dry feed and liquids is done in the TVA type continuous ammoniator. In addition to water, which is usually required for proper agglomerating constancy, 60-66° Be' sulphuric acid, ammonia solutions, and anhydrous ammonia are piped into the ammoniator and are introduced under the bed of material.

The amount of anhydrous added is a function of the ammoniation rate but generally will be limited to several units when formulating grades such as 10-10-10. Additional nitrogen is introduced in solutions, and as soluble ammonium nitrate salts. The nitrates lend plasticity to the mix, and are essential in granulation. By addition of sulphuric acid, the heat of reaction with excess ammonia aids plasticity, and as such is very desirable when granular fertilizers are being processed. Any excess heat formed will evaporate moisture from the mix, and thus can be regarded as a process 'extra.' As larger and larger amounts of heat are released, a smaller quantity of external heat will be applied to bring the final moisture content of the product to the low percentages desired.

While the percentage of granular production is expected to increase, normal mixed goods and semi-granular are being produced with the same system. The continuous process therefore extends its advantages and lowered costs into present everyday operations.



1—Control Room showing furnace combination starters. 2—Operating Platform showing controls & oil burner. 3—View showing T.V.A. Fume Hood and Syntron Feeder. 4—'Countersunk' trunnion base when looking from cooler discharge end. 5—Dryer Drum with spur gear and Hammer lifts—Cyclone in background.



Clyde Speck and Willard King load fertilizer in the spreader, for use on Mr. Speck's farm, near Asbury, New Jersey.

MOLYBDENUM increases alfalfa yield on New Jersey soil

Adding Molybdenum to Moly-deficient soil gives the farmer higher yields of alfalfa

Scientists* have shown that when proper amounts of Moly are added to acid Moly-deficient soils in New Jersey, marked improvement in yield and protein content of alfalfa results. Both field and laboratory tests were conducted upon the benefits resulting from the proper use of Molybdenum. In many areas of New Jersey centuries of leaching have robbed the soil of much of its available Molybdenum. With this deficiency corrected, alfalfa yields showed improvement of over 12%.

Experience of Mr. Clyde Speck demonstrates this notable improvement

On his farm near Asbury, New Jersey, Mr. Speck has a field of some 14 acres planted to alfalfa. His yields on successive cuttings decreased, and finally Mr. Speck decided to put the field to other use.

"About this time," said Mr. Speck, "I showed this field to a salesman for a fertilizer company. He examined my soil and told me that other farmers in this area had been having trouble with alfalfa. He suggested that we use Moly on this field of mine, and then re-seed.

"We applied Moly, about 2 to 3 ounces per acre. We had the Moly mixed with my regular fertilizer, and then I re-seeded. For the three years since I applied Moly to this field I have had good stands of alfalfa and the yields are fine. Moly made the difference."

*Evans, H. J. and Purvis, E. R. (Rutgers University) "Molybdenum status of some New Jersey soils in respect to alfalfa production".—Agronomy Journal 43:70-71 (1951).

All crops need Moly, as shown by widespread tests in U.S. and abroad

During the last 15 years tests made in many parts of the United States and abroad show conclusively that all crops need Moly in a form that can readily be assimilated. When available Moly is not present in the soil Moly should be added, either alone or combined with fertilizers.

"My alfalfa field now has a full stand," says Mr. Speck, "and I feel that with its Moly-deficiency corrected it will continue in high production for several years."

It will pay you to find out now whether your own soil can benefit from the use of Moly

If you are getting low yields on crops such as alfalfa, cauliflower, tobacco, lettuce, beets or citrus, get in touch with your County Agent. He will be glad to help you set up test plots.

Write for our Bulletin: "Testing for Molybdenum Deficiency". Address Dept. 5I, Climax Molybdenum Company, 500 Fifth Avenue, New York 36, New York.

MOLY CAN BE ADDED TO ANY FERTILIZER BLEND

When ordering fertilizer you can always specify that Molybdenum be included as an additive.

CLIMAX MOLYBDENUM

ALABAMA

E.F.&T. Agricultural Ferttox Co., Prichard, has been granted a license by City Council and will soon open its plant. Partners are **S. P. Easterling** and **W. G. Fain.**

ARIZONA

Southwestern Agrochemical, Chandler, broke ground July 5, with due ceremony for what will develop into a $5,000,000 ammonia and fertilizer plant. Capacity is reported at one third of the State's present consumption, and the plant will be the first of its kind in Arizona. **Utah Construction** holds the contract for construction of the first unit, which will be completed within a year. Engineering for the balance will proceed during this construction period. **J. Clyde Wilson** is board chairman.

CALIFORNIA

Shell Chemical is broadening the base of its Pittsburg plant by adding 5,000 annual tons of diammonium phosphate to the present ammonium sulphate output. This is, incidentally, a demonstration of the flexibility of their operation, which is patterned after the TVA method.

FLORIDA

Coronet Phosphate, Plant City, have made land available to the community so that the auxiliary policemen might have a range on which to practice the use of firearms.

* * *

International Minerals and Chemical have awarded two $2400 scholarships to Polk County high school seniors, which provide four-year college courses. One goes to an employe's son or daughter, the other to a non-employe resident of the county.

ILLINOIS

The Texas Co. will shortly begin construction of an ammonia plant of 180 daily ton capacity at its Lockport refinery, according to general manager, **L. C. Kemp, Jr.** Facilities will be set up to convert a substantial portion of ammonia to nitrogen solutions when the plant is complete in late 1957.

LOUISIANA

The House of Representatives has sent back to committee, thus probably killing it, the effort to put a tax of $2.75 per ton on sulphur.

* * *

Poultry By-Products, Inc., New Orleans, has been chartered to manufacture fertilizer.

MARYLAND

Food Machinery & Chemical, Baltimore, is equipping two new departments to fill government contracts at the Fairfield Chemical Division, crop chemical unit.

MICHIGAN

Dow Chemical, subject to acquisition of **Bay Refining** is planning a petrochemical plant on property it now owns, adjacent to Bay Refining.

MISSISSIPPI

Coastal Chemical Corporation is being promoted on the same plan which helped build its parent, **Mississippi Chemical's,** at Yazoo City. Meetings are being held so that farmers may be told first hand the benefits to stockholder users of the new plant which is destined to go up at Pascagoula.

* * *

MISSOURI

Houston Fertilizer, Houston, were robbed of four tons of fertilizer in mid-June. The Sheriff now says he has signed statements from two of the three in the robbery, one of whom was an applicant for a State Highway Patrol job.

Kansas City Stockyards has acquired a dehydrating plant and is marketing a packaged, dehydrated manure.

NEW YORK

Zonolite's purchase of a plant in Utica brings to 21 the number of processing plants they operate.

NEBRASKA

B-W Fertilizer is making fertilizer "pills" that fit into a garden hose, and liquid plant food in plastic bottles. **Henry B. Bothe** and **Elmer Wurdeman** are proprietors of the new Columbus concern.

OHIO

Standard Oil of Ohio has approved expenditures of $2,400,000 for a new research center to be located in Warrensville Heights. It will have 55,000 square feet of floor space, facing a new 1½ acre lake.

OKLAHOMA

Monarch Fertilizer is among the Muskogee concerns to be guests of the local newspaper and movie houses.

OREGON

Chipman Chemical are in production with their new plant turning out 2,4-D compounds. The development involves about $1,000,000.

* * *

Farm Chemicals, Athena, have announced plans for a second herbicide plant, to cost $60,000 according to manager, **C. E. Hesp.**

PENNSYLVANIA

Dorr-Oliver have announced a $900,000 expansion program of their manufacturing plant at Hazleton. Greatly enlarged fabricating facilities will enable Dorr-Oliver to produce, at its own manufacturing plant, structural parts which have been sub-contracted to outside firms in the past. These new facilities will, in addition, allow greater production flexibility and control.

Erection of two new buildings totaling 30,000 square feet will bring the Hazleton plant floor space to roughly 125,000 square feet or nearly three acres. A major portion of the new floor space will be devoted to expansion of the fabricating section and additional storeroom space, but will involve considerable rearrangement of other production departments. With construction already begun, the new facilities are expected to be in operation by the end of the year.

TENNESSEE

Shea Chemical will soon complete construction of its new phosphorus furnace at Columbia. They will then take the original furnace off the line for enlargement and repairs. When the two furnaces are both in production, late this Fall, their capacity will have been increased 140% — doubling sodium phosphate and adding a third to phosphoric acid capacity. The program is estimated to cost $3,000,000, including added phosphate rock reserves, increased storage and nodulizing facilities and a water intake on Duck River.

• • •

Valley Hill Chemical, Jackson, with the installation of its new fertilizer blending equipment, will be able to turn out 125 daily tons.

TEXAS

Chillicothe Petrochemicals, Chillicothe, is asking approval of the Texas Securities Commission for sale of $3,500,000 of stock with which to build an anhydrous ammonia plant, which would turn out 180 daily tons and cost more than $7,500,000. **Dr. R. E. Sitta** is president.

AFRICA

Anglo-American Rhodesian Mineral Exploration Ltd. has been granted a one-year prospecting license to explore the phosphate deposits, said to contain 3,000,000 tons of ore, in Nyasaland.

CANADA

Texas Gulf Sulphur's subsidiary, Middle River Mining, is reported to have turned up what looks like a big find of sulphides in the Bald Mountain Area.

• • •

British America Oil is now under way with construction of its new sulphur plant in Southern Alberta which was delayed by unfavorable weather conditions. It should be ready by October, producing 225 long tons of sulphur and 2200 bbls of condensate daily.

FRANCE

Potasse & Engrais Chimiques, Paris, has awarded a contract to **Chemical and Industrial International** of Nassau, Bahamas, for a **C&I** designed nitric acid plant. C&I has exclusive rights to license C&I processes outside the U.S. and Canada, and will furnish and supervise the construction of the 150 daily ton C&I nitric acid plant for PEC at Grand Couronne, where their large nitrophosphate plant is located. This is the first C&I designed high pressure nitric acid plant to be built in Europe where the atmospheric, or low pressure, plants have been popular for many years.

Newly-designed Trona trademark (top) for complete line of American Potash & Chemical Corporation products is displayed with former trademark (lower) by William F. J. Francis, vice-president in charge of Sales for the chemical company.

GREECE

The Government will call for tenders on a nitrate fertilizer plant at Ptolemais, West Macedonia which should produce 70,000 annual tons, and has been estimated around $25,000,000.

MEXICO

Pan American Sulphur will expand its Jaltipan, Veracruz, plant to more than 1,000,000 annual tons by an investment of about $1,500,000.

Gulf Sulphur's plant is not at Navojoa, Sonora, as we made it last month. That's where **Pennsalt's** new plant is located. The Gulf Sulphur plant is at San Cristobal, Veracruz. What happened was that the two items got consolidated by some fluke,—one of the hazards of the publishing business. The error proves an eager readership, however, because we were hardly in the mail when good friends pointed it out.

VENEZUELA

Air Products has been awarded a government contract to design and fabricate an air separation plant and a hydrogen purification plant. The two are to be installed some time next year at a cost of well over $1,000,000 to produce 120 daily tons of ammonia. This is the first petrochemical operation of its type in South America.

Farm Income Has Turned The Corner

"Farm income currently is running about half a billion dollars higher than the rate during the last half of 1955," said Acting Secretary of Agriculture True D. Morse in mid-July.

"The increase is largely due to the 11 percent rise in farm prices which has occurred since December. The parity ration in mid-June was above a year ago for the first time since 1951.

"The general downward drift in farm income which began in 1951 has been hard on farmers," said Mr. Morse. "The report is therefore especially welcome. Net realized income was above the 1955 average during both the first and second quarters of this year. This is the sharpest and longest sustained improvement in farm income we have experienced in recent years."

Fertilizer Industry Should Support Farm-City Week

As we have said before, the entire fertilizer industry should get behind the Farm-City Week, November 16-22, which is a tradition with the National Grange. It is an opportunity for the farmer to let the urbanite know the facts about agriculture, and it is — to the Grange's way of thinking—vital that this be done with full enthusiasm and organization.

As the Grange points out, it will not be long until the non-farmers will make up 90% of the population, and the city man will be telling the country man what he can and cannot do. It is their feeling that the rural people must tell their story and tell it well or the trend away from the farm will lead to "cheap food" policies and a peasant type of agriculture, they believe.

The fertilizer industry, with its entire stake in agriculture, has a vital interest in aiding the promotion of the program the Grange offers. And we suggest you write The National Grange, 744 Jackson Place, N. W., Washington 6, D. C., for advice on how you can cooperate with the farmers of your area in the development of this big idea.

...SOME DAY
BAGS MAY OPEN LIKE THIS

...but until they do,

your best choice is an

A&S Zip-Top

Today, even though your product may be the best on the market—or even unique—it must be delivered to your customers in a modern, attractive and *efficient* package, or you risk losing out to your competition.

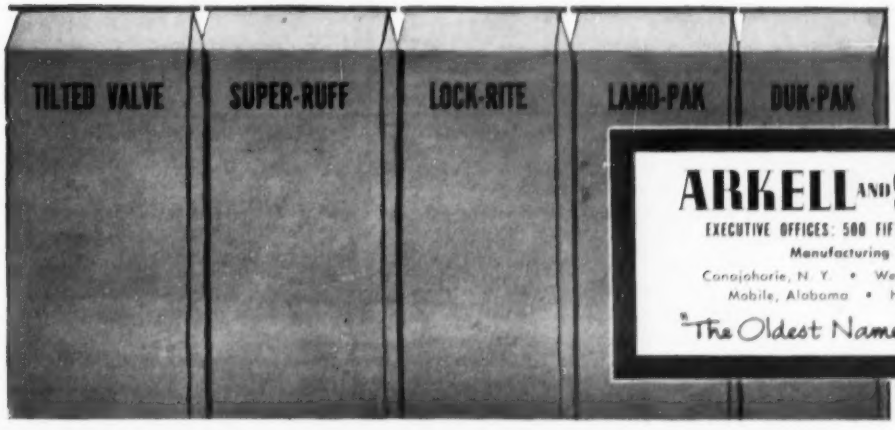
A & S "Zip-Top" Multiwall Bags combine the art of package design with the science of package engineering. Starting with the popular A & S sewn valve and sewn open-mouth bags, we have modified the manufacturing process to include a simple and economical innovation, permitting easy opening with *one sharp pull.* In a matter of seconds, your product pours out through the smooth, wide multiwall mouth...no waste and no time lost.

And to remind your customers of the name of the firm whose products come in such *convenient* bags, we design and print eyecatching display advertisements on them...using the most efficient and up-to-date presses, inks and techniques.

When you start using A & S "Zip-Top" multiwalls, you can be confident that your customers will get the best possible impression of you and your products!

Let A & S take over your packaging problem today!

FOR ADDITIONAL INFORMATION, WRITE TO ARKELL & SMITHS, PACKAGING DIVISION, CANAJOHARIE, NEW YORK.



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Manufacturing Plants at:

Canajoharie, N. Y. • Wellsburg, West Virginia
Mobile, Alabama • Hudson Falls, N. Y.

"The Oldest Name in Paper Bags"

Personals

Bruce K. Brown has been made president of **Petroleum Chemicals,** jointly owned by **Continental Oil** and **Cities Service,** and headquarters will be moved to New Orleans. Mr. Brown, now president of **Pan Am Southern** will take over his new post when Pan-Am is merged with another concern.

* * *

The insecticide division of **Olin Mathieson** with headquarters at Baltimore has expanded its technical service department to incorporate responsibilities formerly handled in the market development department and **Kenneth B. Nash,** former manager of technical service now will head the combined department.

W. B. Jordan, formerly head of market development, is now manager of the Western sales district of the insecticide division, with headquarters at Fresno, California.

* * *

In a reorganization of the sales department of **International Paper Company's** Bagpak division which divides the country into four sales regions, **Lee Turner** has been named Eastern regional sales manager with headquarters in Baltimore; **E. C. Miller,** was appointed Midwest regional sales manager with headquarters in Chicago; **H. Currie** was named Southern regional sales manager with headquarters in New Orleans; and **R. A. Gair** was promoted to Western regional sales manager with headquarters in Denver.

* * *

Dorr-Oliver Incorporated has reorganized its sales department under **T. Bartow Ford,** vice president in charge of sales. **William E. Smith** has been designated general sales manager and is responsible for all line sales. Mr. Smith, former assistant sales manager, has been with Dorr-Oliver since 1924, and was Canadian division manager from 1941 to 1948.

Glen G. Reed has been named manager of sales service and is responsible for D-O field engineering, new product promotion, and organization of equipment distributorships. Mr. Reed joined the organization in 1947.

Industrial Sales, headquartered in Stamford, Conn., continues under **Glenn O. Wilson,** manager, with **Theodore T. Meehan** named to the post of assistant to the manager. The new post of special assistant to the industrial sales manager has been filled by **Daniel C. Gillespie,** who will assist Mr. Wilson in the handling of products formerly marketed by **Merco Centrifugal Co.**

The newly established Mountain Industrial division, with **William T. Marston** as division manager, serves the states of Montana, Idaho, Wyoming, Utah, Colorado, Arizona and New Mexico. **Richmond M. Stampley,** former Western filtration division manager, succeeds Mr. Marston as Western industrial division manager with **Donald T. Tarr** as newly named assistant manager in Oakland.

In the Central Industrial division, **Roy A. Johnson** and **Gordon M. Girdwood** continue as manager and assistant manager, respectively, with headquarters in Chicago.

Kenneth F. Rupp who has been appointed Arkell & Smiths' sales representative in their Central sales division territory, with headquarters in Columbus, Ohio. He is reporting to R. C. Masoner, Central Division Sales Manager.

The new South Central division at Dallas, Texas, includes the states of Oklahoma, Texas, Louisiana and Arkansas. **Edward F. Porter** was promoted to manager of this division.

In the Eastern Industrial division, **Robert F. Clemens** continues as manager, with **George A. Love** appointed assistant manager.

The new Southeastern industrial division comprises the six southeastern states formerly served by Eastern Division. **Irving W. Johnston** has been promoted to manager of Southeastern division. **Joseph A. Kenney** and **Henry A. Bauer** have been transferred to Atlanta, Ga., from Stamford, Conn. These staff changes locate filtration experts in the southeastern area.

* * *

Lester Ginsburg, vice president of **Electric Bond and Share,** has been elected to the board of directors of **Escambia Bay Chemical Corporation.**

* * *

Peter Colefax, president of **American Potash & Chemical,** announced recently that **Daniel S. Dinsmoor** has been named vice-president in charge of planning and development for the company, and **Joseph C. Schumacher** has been elevated to vice-president in charge of research.

Harold Mazza has been appointed to the newly-established position of manager, research, at the Los Angeles plant.

* * *

Paul D. Littlefield has been elected treasurer and **George B. Moran** has joined **Freeport Sulphur** as vice-president in charge of domestic and foreign sales.

* * *

Dr. William F. Waldeck, former director of research for **Wyandotte Chemical,** now fills a newly-created post as technical director of **Shea Chemical,** where he will direct development of new products and processes, according to **Vincent H. Shea,** the firm's president.

* * *

Anthony E. Cascino has been appointed to the newly created post of director of marketing for **International Minerals & Chemical.**

In establishing the new post and announcing the appointment of Mr. Cascino, **Thomas M. Ware,** International's administrative vice presi-

Deane F. Wicks is now Eastern district sales manager for the multiwall bag division of Raymond Bag, with New York as headquarters.

dent, emphasized the importance of coordinating the market activity of each of the company's six product divisions. He said that Mr. Cascino's new responsibilities would be to effect such coordination in the areas of advertising, sales, merchandising and market research.

• • •

American Agricultural Chemical has announced that **R. M. Richey** is now superintendent of the Western division; **H. B. Houghtaling** has taken his place as superintendent of the Southeastern division; **Richard R. Benson** is assistant manager of the Cleveland sales office.

• • •

Boyd B. Mahon, Jr., is now assistant salesmanager and **Harold E. Huber** is manager of technical sales for the **Votator Division** of **Girdler,** which is a division of **National Cylinder Gas.**

• • •

Commercial Solvents has appointed two in its market development department: **Eugene M. Seidel** is Western manager; **Marion E. Tislow** will replace him as Midwest field representative.

• • •

Dr. Thomas Hurst has been named an assistant director of research for

Frederick R. Anspach who has succeeded S. R. Coale, resigned, as sales manager of the Thomas Fertilizer Division of Pennsalt Chemicals. Mr. Anspach joined the Thomas organization as a soil chemist in 1939.

Monsanto's inorganic chemicals division. At the same time, the promotions of **Robin Russell** and **Robert T. Webber** to group leaders in the inorganic research department were announced.

• • •

Among the scientists named to the European operations staff of **Armour Research Foundation** of Illinois Institute of Technology, Chicago, as an observer for the European Technical Observation Group recently established by the Foundation is **Dr. Hugo H. Peter.**

• • •

Max D. Kirkland, New Jersey extension service Farm Radio-TV editor, Rutgers University, was presented the **American Association of Agricultural College Editors-National Plant Food Institute Agricultural Communications Award** July 16 at **Pennsylvania State University.** Announcement of the award was made by **George S. Round,** extension editor, University of Nebraska, president of AAACE, at its 40th Annual Convention at the University.

Louis H. Wilson, secretary and director of information for the Institute, presented Mr. Kirkland a scroll signed by the national judges and a check for $500 to be used for advanced professional training in agricultural communications.

C. Meredith Evans, Jr., formerly assistant manager of Virginia-Carolina Chemical Corporation's Richmond, Va., sales office, who has been named manager of the firm's Cincinnati sales office. He succeeds A. J. Darfus who retired June 30 after 34 years of service with V-C.

Virginia-Carolina's B. U. Jones, who represents them at Laurel, Miss., is reported in the local press as getting top consideration by the Governor for the newly created post as head of the agricultural division of the State Agricultural and Industrial Board.

• • •

G. H. Alfriend retired the other day as traffic manager after 44 years service with **V-C.** A surprise luncheon turned out a lot of top brass to honor the 67-year-old, who went through a lot of kidding with the big grin for which he is famous around Virginia-Carolina. 140 of his fellows turned out, gave him some humorous gifts—and a paid-up

Thomas B. Potter, assistant to the vice president, Petrochemical division, Commercial Solvents Corporation, who has been named secretary and assistant treasurer of Northwest Nitro-Chemicals, Ltd., a Canadian affiliate of CSC.

membership in the golf club where he recently shot a hole-in-one. They say "Gil" got home very late that evening.

• • •

H. P. Smith of the Texas AES was awarded the 1956 Cyrus W. McCormick gold medal.

• • •

G. L. Govero, assistant to the supervisor of multiwall bag sales, **Bemis Bro. Bag Company,** was selected as a group discussion leader for a summer American Management Association workshop seminar dealing with organization and techniques of sales forecasting held recently at Colgate University. Approximately 1,600 business executives from all parts of the United States and Canada participated in the program.

• • •

Dr. T. K. Wolfe, director of volume building services for **Southern States Co-operative,** has been elected one of 36 district directors for the National Sales Executives Association.

• • •

B. W. (Billy) Threadgill, formerly with Spencer Chemical Company, is now with Oklahoma Fertilizer Co., Oklahoma City.

• • •

William B. Harrison, who sells for **Royster Guano** in the Rocky Mountain N. C. area has been elected vice-president of the Rocky Mount Chamber of Commerce.

• • •

William F. Watkins has been named assistant manager of government services for Olin Mathieson's plant food, insecticides and industrial chemicals divisions, according

5 PHILLIPS Fertilizer Materials for High Analysis Mixtures

1 Ammonium Sulfate

New Premium Quality Phillips *66* Ammonium Sulfate contains 21% nitrogen, 23.8% sulfur. It is *dry*-cured to remove excess moisture, prevent caking. Uniform dust-free crystals flow freely, mix easily. Ideal for all analyses of mixed goods and for direct application. Available in bags or bulk.

2 Anhydrous Ammonia

Phillips *66* Agricultural Ammonia contains 82% nitrogen. It's a convenient, economical source of nitrogen for mixed goods formulation. Tank car shipments are assured to Phillips contract customers by Phillips huge production facilities in the Texas Panhandle and at Houston, Texas.

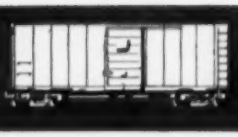
3 Nitrogen Solutions

Get more N per dollar! There are three Phillips *66* Nitrogen Solutions for use in preparation of high-analysis fertilizers and the ammoniation of superphosphate. These solutions keep manufacturing costs low; help rapid, thorough curing.

4 Ammonium Nitrate

Phillips *66* Prilled Ammonium Nitrate contains 33.5% nitrogen. The small, coated prills resist caking, handle easily. Depend on Phillips *66* Prilled Ammonium Nitrate for free-flowing uniform properties and top-notch crop response as a direct application material. It's an ideal companion high nitrogen fertilizer for quality mixed goods.

5 Triple Superphosphate



Phillips *66* Triple Superphosphate contains 46% available phosphoric acid. Ideal for use in formulation of high-analysis fertilizers.

PHILLIPS CHEMICAL COMPANY

A Subsidiary of Phillips Petroleum Company, Bartlesville, Oklahoma

ATLANTA, GA.—1428 West Peachtree Street
AMARILLO, TEX.—First Nat'l Bank Bldg.
BARTLESVILLE, OKLA.—Adams Bldg.
CHICAGO, ILL.—7 South Dearborn St.
DENVER, COLO.—1375 Kearney Ave.
DES MOINES, IOWA—806 Hubbell Bldg.
HOUSTON, TEX.—1020 E. Holcombe Blvd.
INDIANAPOLIS, IND.—1112 N. Pennsylvania St.
KANSAS CITY, MO.—500 West 39th St.
MINNEAPOLIS, MINN.—212 Sixth St. South
NEW YORK, N. Y.—80 Broadway
OMAHA, NEB.—WOW Building
PASADENA, CALIF.—330 Security Bldg.
RALEIGH, N. C.—804 St. Mary's St.
SALT LAKE CITY, UTAH—68 South Main St.
SPOKANE, WASH.—521 E. Sprague
ST. LOUIS, MO.—4251 Lindell Blvd.
TAMPA, FLA.—3737 Neptune St.
TULSA, OKLA.—1708 Utica Square
WICHITA, KAN.—501 KFH Building

to word from **G. P. Vincent,** manager of government services.

Robert S. Ray, new **Brea Chemicals** vice-president, has also been made a member of their board of directors, president **Homer Reed** announces. He has been with them since they started in 1953 as manager of manufacturing.

• • •

Dr. U. T. Greene of **Diamond Alkali** has been appointed Director of the Chemical and Rubber Division, Business and Defense Administration, U. S. Dept. of Commerce.

Bemis Plastic Package Plant Now In Production

The new Plastic Package Plant, Bemis Bro. Bag Company, in Terre Haute, Indiana, has started production. Office functions previously carried on at Bemis' Flexible Package Plant, Chicago, have been moved to the new plant.

The plant is a modern one-story building equipped with the latest in high-speed polyethylene bag manufacturing and printing equipment, including exclusive machinery developed by Bemis. The addition of new equipment has greatly expanded Bemis facilities for prompt service on polyethylene bag orders.

Sturtevant Mill Company Offers New Catalog

Dry Processing Equipment is the subject of a new eight-page booklet now being made available to industry by Sturtevant Mill Co., 150 Clayton Street, Boston 22, Mass. Title is "Sturtevant Dry Processing Equipment—the 'Open-Door' to Lower Operating Costs over More Years."

Stated briefly, the unique "open-door" feature of all Sturtevant equipment means that the vital parts of any unit are accessible by "one man in one minute" — that cleaning, inspection and maintenance are accomplished easily and fast.

The literature also discusses Sturtevant's unusual "Cooperative Engineering Plan.'" This permits a manufacturer with a problem to take advantage of Sturtevant's 80-plus years of experience at either no cost or a charge proportional to the value received whether that value be in the form of specific recommendations or a completely engineered job.

Specifications and photos of crushers, grinders, pulverizers, micron-grinders, separators, granulators, blenders, mixers, feeders, screens, elevators, conveyors, mechanical dens and excavators are also included. The brochure deals mainly with production equipment but details of laboratory units are included as well.

OBITUARIES

Albert Edwin Cummer, 80, president of F. D. Cummer & Son Co., Sarasota, Fla., died June 16, in hospital. He and his father were pioneers in the invention of equipment for the processing of phosphate and calcium.

Roland Scott Hill, 41, vice president of Reliance Fertilizer & Lime Corp., Norfolk, died July 16 at Courtland, Va., after an illness of several months.

John R. Hudson, in the fertilizer business since 1900 and president of Alabama Fertilizer Company, Montgomery, died June 26 at his home after a long illness.

Robert Lochbie Payne, 79, retired State manager for American Agriculture Chemical Co., died June 18 at Columbia Hospital after an extended illness.

George Stevenson Rose, 52, with Virginia Carolina Chemical for 38 years, died July 11 in Richmond, Va.

CF Staff-Tabulated TONNAGE REPORTS

FERTILIZER TONNAGE REPORT (in equivalent short tons) Compiled by Cooperating State Control officials and Tabulated by COMMERCIAL FERTILIZER Staff

	June		May		April	Jan.-Feb.-Mar. Quar.		July thru Dec.		Year (July-June)	
State	1956	1955	1956	1955	1956	1956	1955	1955	1954	1954-55	1953-54
Alabama	.....	53,488[1]	155,509	114,011	312,676	347,660	433,390	167,372	272,068	1,114,238	1,074,892
Arkansas	.....	21,126[1]	40,577	42,602	90,923	141,981	134,588	60,294	59,997	330,776	366,225
Georgia	147,230	115,109	280,937	226,707	343,425	221,862	328,956	250,968	225,083	1,273,445	1,361,254
Kentucky	.....	.....	.....	.....	105,564	168,371	172,883	88,119	91,386	524,488	577,929
Louisiana	19,883	20,215	33,722	33,281	67,269	93,469	123,971	59,345	78,067	310,848	325,218
Missouri	23,382	18,720	85,055	84,582	100,039	235,254	189,351	360,211	268,257	682,690	756,457
North Carolina	.....	72,664[1]	235,304	216,217	418,843	681,897	825,492	225,182	264,475	1,830,633	1,815,572
Oklahoma	6,085	5,028	13,915	9,088	13,969	31,884	35,770	69,542	58,406	122,305	144,367
South Carolina	33,262	37,991	88,324	75,096	169,465	452,619	521,836	119,947	132,604	928,715	936,558
Tennessee	108,890	25,862	121,941	104,721	97,059	50,736	63,463	136,925	167,383	523,349	523,303
Texas	49,681	32,273	65,024	60,376	77,188	180,802	214,792	193,704	212,885	584,269	560,381
California (reports submitted quarterly)						280,853	283,155	361,615	318,270	922,127	830,327
Virginia (reports submitted quarterly)							287,367[1]	.....	159,185[1]	795,770	780,931
Indiana (reports submitted semi-annually)								242,530	284,994	1,158,960	1,180,091
New Jersey (reports submitted semi-annually)								.....	53,830[1]	.....	289,614[1]
Washington (reports submitted semi-annually)								48,749	58,162	182,348[1]	*
TOTAL	388,414	255,198	1,120,308	966,681	1,796,420	2,887,388	3,327,647	2,384,503	2,486,900	11,102,613	11,233,505

.....(not yet reported) *Not compiled [1] Omitted from column total to allow comparison with some period of current year.

MARKETS

ORGANICS: Organics for fertilizer use appear to be in good balance with demand and producers have made contracts for current and season's needs in excellent volume. Prices of Nitrogenous Tankage range from $3.00 to $4.00 per ton of Ammonia, bulk, f.o.b. production points for July and August shipment with 25c per unit Ammonia rise for September through December shipment. Activated Sludge is priced at $2.75 per unit of Ammonia and 50c per unit of APA, bulk, f.o.b. Midwestern production point for July and August shipment and $2.95 and 50c for September through June 1957 shipment.

Another production of Sewage Sludge is currently indicated at $3.00 per unit of Nitrogen and 50c per unit of APA, bulk, f.o.b. Southwestern production point.

CASTOR POMACE: Contracts are being made for July, August and September shipment at $35.00 per ton, bagged, f.o.b. Northeastern production points but, as production continues at a low level, available supply is not plentiful.

DRIED BLOOD: Unground Blood, in bags, is indicated at $4.75 to $5.00 per unit of Ammonia in the Chicago area and about $4.50 in the New York area.

POTASH: Contracting for the new season approximates the quantities for the 1954-55 fertilizer year. Shipments are meager for this time of the year and most of the production is being put into storage.

GROUND COTTON BUR ASH: Demand continues good for this source of Potash which is primarily in the form of Carbonate of Potash. Supplies are available for shipment prompt through June. Current analyses vary from 38% to 42% K_2O.

SUPERPHOSPHATE: Demand for domestic use is seasonally slack but export movement is in good volume and prices firm and somewhat higher than during the season just ended. Increased costs of Phosphate rock will tend to discourage any lower prices.

PHOSPHATE ROCK: A recent advance of 12c per long ton became effective from some major producers although other producers are quoting unchanged prices for the time being. The increase is the result of an advance of 4c per hour in labor costs effective July 1st. Producers are currently absorbing 14c per barrel increase in fuel oil that became effective June 27th.

NITRATE OF SODA: Stocks are adequate to cover the seasonal demand and prices remain unchanged.

SULPHATE OF AMMONIA: Prices continue at the $32.00 per ton bulk price f.o.b. interior mills on coke oven material and stocks are in long position.

GENERAL: This time of the year fertilizer manufacturers are contracting and planning for the new season with production and shipment of mixed goods practically at an end for the old season.

New Control Law In Pennsylvania

A new law has been enacted by Pennsylvania which requires that manufacturers or importers register with the State Department of Agriculture each brand or grade of commercial fertilizer for sale in the State. Registrations made prior to July 1, when the law took effect, will not expire, however, until June 30 of next year.

Registration applications, which call for a $15 fee, and full information on the new regulation can be had from the Director, Bureau of Foods & Chemistry, Pennsylvania Dept. of Agriculture, 103 South Office Bldg., Harrisburg.

King Heads Joint Grassland Committee

At the 2-day meeting held by the American Society of Agricultural Engineering the Joint Committee on Grassland Farming staged a program on this subject, which included a day of grassland farming tour. Dr. Willis A. King, Clemson dairy department head, was named chairman of the Joint Committee. He succeeds Dr. Howard B. Sprague of Penn State.

LINK-BELT "turn-key" SERVICE

unlocks new efficiencies in fertilizer production

Up goes steel work and Link-Belt equipment for another fertilizer plant handled on a "turn-key" contract. This TVA continuous ammoniator process will utilize anhydrous ammonia and ammonium nitrate solutions.

Under this inclusive 5-point program, LINK-BELT will:

1. **PILOT THE PROCESS,** using our complete laboratory and test facilities.
2. **DESIGN THE SYSTEM** as an efficient, integrated operation conforming to your exact needs.
3. **FABRICATE THE EQUIPMENT.** Link-Belt makes a complete line—will also supply special requirements.
4. **ERECT THE PLANT,** providing crews and supervisory service.
5. **START THE OPERATION,** with field engineers ready to make final adjustments.

FREEDOM from construction detail . . . integrated operation . . . a uniform product—Link-Belt "turn-key" service offers these and more benefits for fertilizer plants. Our specialists stand ready to cooperate with your engineers or consultants to produce a top-grade fertilizer at minimum cost.

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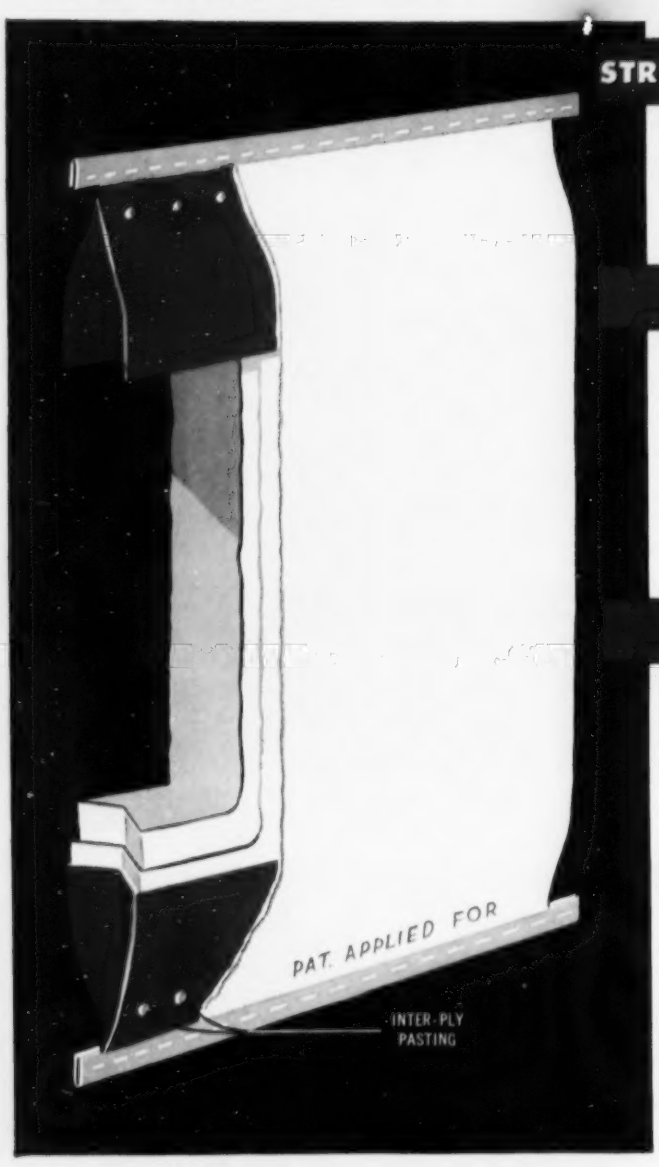
the shipping sack with BALANCED STRENGTH



STRONGER AT THE RIGHT PLACES

New Bemis Strength-End Multiwalls, strengthened top and bottom where most sewn bag breakage is experienced, will cut packing troubles and costs for you.

TWO WAYS TO SAVE

You'll save money one of these two ways with Bemis Strength-End Multiwalls: You may switch from a more expensive type of shipping container. Or, if you are already using multiwalls, you might use bags with fewer plies, because of the greater end strength, where it is needed. Bemis Strength-End Multiwalls may, at lower cost, do your job as well or better.

SUCCESSFULLY TESTED

Bemis Strength-End Multiwalls have been successfully tested in all sections of the country and under all climatic conditions. They have proved themselves for packing cement, fertilizer, chemicals, flour, salt.

Here's how it's reinforced

The reinforcement in Bemis Strength-End Multiwalls is a strip of sturdy kraft, several inches wide, running horizontally around the bag at the ends . . . anchored to the other walls so it works in conjunction with them . . . and adding greatly to the strength both at the sewing line and at the gusset corners. It's just plain, common-sense, balanced strength construction.

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COMMERCIAL FERTILIZERS CONSUMPTION in the United States 1954-55

by

WALTER SCHOLL, HILDA M. WALLACE and ESTHER I. FOX

Fertilizer and Agricultural Lime Section
Soil and Water Conservation Research Branch
Agricultural Research Service
U. S. Department of Agriculture
Beltsville, Maryland

For the year ended June 30, 1955, the consumption of fertilizers in the United States and Territories amounted to 22,723,705 tons, a decrease of 49,794 tons (0.22 percent) from consumption in 1953-54. This quantity comprised 21,943,397 tons of products containing one or more of the primary nutrients (N, P_2O_5, K_2O) and 780,308 tons of the secondary and trace element materials which did not contain primary nutrients. The total consumption of products containing primary nutrients was 214,589 tons (0.97 percent) less than that in 1953-54 while the consumption of products that did

Table 1—Consumption of Fertilizers, Year Ended June 30, 1955[1]

State & Region	Mixtures			Materials[2]			All Fertilizers 1954-55	Relative Consumption 1953-54 = 100	
	July 1–Dec. 31, 1954	Jan. 1–June 30, 1955	Total	July 1–Dec. 31, 1954	Jan. 1–June 30, 1955	Total		Fertilizers [3]	Total N, Avail. P_2O_5 & K_2O
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Percent	Percent
Maine	18,456	156,555	175,011	2,116	5,185	7,301	182,312	106	110
New Hampshire	1,602	12,240	13,842	1,024	3,577	4,601	18,443	116	122
Vermont	2,859	27,817	30,676	12,248	5,565	17,813	48,489	126	122
Massachusetts	10,343	57,673	68,016	5,407	11,932	17,339	85,355	100	105
Rhode Island	1,643	12,958	14,601	533	1,424	1,957	16,558	107	115
Connecticut	6,662	56,253	62,915	3,070	22,476	25,566	88,481	98	99
New England	41,565	323,496	365,061	24,418	50,159	74,577	439,638	106	109
New York	102,568	441,598	544,166	26,202	59,935	86,137	630,303	103	107
New Jersey	47,062	213,631	260,693	7,324	18,319	25,643	286,336	98	99
Pennsylvania	181,834	448,216	630,050	23,405	61,163	84,568	714,618	105	109
Delaware	13,358	77,081	90,439	912	4,284	5,196	95,635	101	102
District of Columbia	790	1,293	2,083	374	368	742	2,825	105	99
Maryland	74,166	223,852	298,018	4,857	14,726	19,583	317,603	102	104
West Virginia	11,766	61,668	73,434	1,802	6,498	8,300	81,734	106	111
Middle Atlantic	431,544	1,467,339	1,898,883	64,878	165,293	230,171	2,129,054	103	106
Virginia	145,929	552,050	697,979	24,431	94,844	119,275	817,254	102	104
North Carolina	234,154	1,248,382	1,482,536	47,072	299,025	346,117	1,828,653	99	102
South Carolina	94,863	550,192	645,055	37,748	246,422	284,170	929,225	99	99
Georgia	178,514	818,210	996,724	52,086	227,204	279,290	1,276,014	93	98
Florida	435,151	670,792	1,105,943	52,522	70,940	123,462	1,229,405	104	106
South Atlantic	1,088,611	3,839,626	4,928,237	213,879	938,435	1,152,314	6,080,551	99	102
Ohio	276,075	737,113	1,013,188	23,275	48,975	72,150	1,085,338	99	107
Indiana	221,171	769,479	990,650	34,438	127,602	162,040	1,152,690	98	107
Illinois	147,385	388,084	535,469	310,697	364,434	675,131	1,210,600	80	90
Michigan	165,092	420,088	585,180	14,647	38,768	53,415	638,595	106	114
Wisconsin	74,704	322,454	397,158	9,115	23,730	32,845	430,003	97	104
East North Central	884,427	2,637,218	3,521,645	392,172	603,409	995,581	4,517,226	94	103
Minnesota	44,018	234,417	278,435	21,072	73,164	94,236	372,671	115	124
Iowa	75,868	292,310	368,178	69,532	147,342	216,874	585,052	90	98
Missouri	187,908	267,709	455,617	83,492	143,804	227,296	682,913	90	95
North Dakota	3,088	20,598	23,686	11,827	27,497	39,324	63,010	132	136
South Dakota	2,370	13,768	16,138	5,004	16,759	21,763	37,901	126	132
Nebraska	9,198	38,794	47,992	43,843	116,378	160,221	208,213	105	106
Kansas	58,889	35,460	94,349	76,566	63,624	140,190	234,539	109	112
West North Central	381,339	903,056	1,284,395	311,336	588,568	899,904	2,184,299	98	105
Kentucky	62,243	352,632	414,875	28,741	79,102	107,843	522,718	90	94
Tennessee	112,710	296,836	409,546	43,758	78,507	122,265	531,811	102	106
Alabama	198,959	663,584	862,543	85,049	212,214	297,263	1,159,806	98	101
Mississippi	19,497	306,385	325,882	151,297	244,475	395,772	721,654	98	98
East South Central	393,409	1,619,437	2,012,846	308,845	614,298	923,143	2,935,989	97	100
Arkansas	29,490	126,808	156,298	41,436	135,073	176,509	332,807	90	95
Louisiana	34,278	137,853	172,131	46,159	102,469	148,628	320,759	101	104
Oklahoma	28,689	40,524	69,213	32,256	25,478	57,734	126,947	87	98
Texas	99,580	210,960	310,540	112,901	162,878	275,799	586,339	105	113
West South Central	192,037	516,145	708,182	232,752	425,918	658,670	1,366,852	98	104
Montana	403	2,605	3,008	6,055	14,623	20,678	23,686	82	85
Idaho	927	4,495	5,422	30,695	70,296	100,991	106,413	121	114
Wyoming	60	1,946	2,006	1,332	7,757	9,089	11,095	102	108
Colorado	3,635	9,818	13,453	9,856	25,423	35,279	48,732	104	101
New Mexico	522	1,608	2,130	7,124	23,330	30,454	32,584	146	157
Arizona	6,461	14,488	20,949	51,423	99,563	150,986	171,935	113	108
Utah	262	3,383	3,645	3,614	20,604	24,218	27,863	98	110
Nevada	230	456	686	1,011	1,484	2,495	3,181	53	53
Mountain	12,500	38,799	51,299	111,110	263,080	374,190	425,489	111	109
Washington	5,602	29,481	35,083	58,648	105,085	163,733	198,816	99	116
Oregon	3,922	18,373	22,295	46,779	103,174	149,953	172,248	117	118
California	81,242	159,019	240,261	672,667	920,885	1,593,552	1,833,813	110	109
Pacific	90,766	206,873	297,639	778,094	1,129,144	1,907,238	2,204,877	112	111
Continental U. S.	3,516,198	11,551,989	15,068,187	2,437,484	4,778,304	7,215,788	22,283,975	99	104
Hawaii	31,282	30,317	61,599	38,568	56,367	94,935	156,534	110	106
Puerto Rico	74,418	143,646	218,064	22,880	42,252	65,132	283,196	104	106
Alaska[4]	.....	.....	.....	.....	.....	.....	.....	.....	.....
Territories	105,700	173,963	279,663	61,448	98,619	160,067	439,730	106	106
Total: 1954-55	3,621,898	11,725,952	15,347,850	2,498,932	4,876,923	7,375,855	22,723,705	99	104
1953-54	3,370,022	12,171,054	15,541,076	2,603,399	4,629,024	7,232,423	22,773,499	100	100
1952-53	3,687,360	12,034,864	15,722,224	3,067,991	4,622,393	7,690,384	23,412,608	102	96

[1] Includes: Ground phosphate rock, basic slag, secondary and trace element materials, such as, borax, sulfur, manganese sulfate, etc., used as separate materials, also fertilizers distributed by Government agencies. Does not include liming materials, but includes gypsum.
[2] Excludes the quantities of materials used for manufacture of commercial mixtures.
[3] Fertilizers which were guaranteed to contain primary plant nutrients (N, P_2O_5, K_2O).
[4] Not available: Consumption of all fertilizers in 1952-53 amounted to 653 tons.

Table 1a—Regional Percentage Distribution of Consumption of Fertilizer Mixtures and Materials.

Region	Mixtures		Materials[1]	
	1953-54	1954-55	1953-54	1954-55
New England	2.26	2.37	0.89	1.01
Middle Atlantic	11.83	12.38	3.19	3.12
South Atlantic	32.31	32.11	15.50	15.62
East N. Central	23.30	22.94	16.62	13.50
West N. Central	8.64	8.37	12.18	12.20
East S. Central	13.13	13.12	13.61	12.51
West S. Central	4.59	4.61	9.42	8.93
Mountain	0.36	0.33	4.66	5.08
Pacific	1.75	1.94	22.15	25.85
Territories	1.83	1.83	1.78	2.18
United States	100.00	100.00	100.00	100.00

[1] Includes the secondary and trace element materials.

not contain primary nutrients was 164,795 tons (26.77 per cent) more than that in 1953-54.

Although the total tonnage of primary nutrient products used in 1954-55 was lower than in 1953-54, the continued trend toward higher analysis products resulted in a greater consumption of primary nutrients. The total use of these nutrients set a new record for the sixteenth consecutive year and amounted to 6,119,841 tons. Thus their consumption was 224,283 tons (3.80 percent) over that in the preceding year. The consumption of nitrogen increased 113,120 tons (6.12 percent) to 1,960,536 tons, and that of available P_2O_5 49,814 tons (2.23 percent) to 2,284,362 tons, and that of K_2O 61,349 tons (3.38 percent) to 1,874,943 tons. The consumption of total P_2O_5 decreased 41,870 tons (1.59 percent) to 2,597,549 tons, owing principally to the decrease in use of phosphate rock which is estimated to have contained an average of 32 percent of total P_2O_5 but ony 3 percent of available P_2O_5.

The average primary nutrient content of fertilizers bearing primary nutrients was 27.89 percent in 1954-55 as compared with 26.61 percent for the preceding year.

The data presented herein were compiled from manufacturers' reports of shipments to agents, distributors, and consumers in the Territories (except Alaska), the District of Columbia, and the States (except California, Florida, Massachusetts, Missouri, North Carolina, South Carolina, and Texas). For the latter seven States the data were compiled chiefly from the reports of the respective fertilizer control officials. No data were available for Alaska. Supplementary information was furnished by the control offices and other State agencies, as well as by fertilizer brokers, and special inquiries were made of all known distributors and custom applicators of anhydrous ammonia and nitrogen solutions. For the first time, this annual report includes the separate tonnages, by States, of anhydrous ammonia, ammonium nitrate-limestone mixtures, nitrogen solutions (including aqua ammonia), and urea. Heretofore the regional distribution of these products (except ammonia and urea) was reported. Only the total tonnage of anhydrous ammonia was shown in the preceding annual reports while the tonnage of urea was included in "other chemical nitrogen materials."

The quantities are reported as 2,000-pound tons. Although the data refer to shipments, the terms "consumption," "sales," and "shipments" are used synonymously. The actual consumption differs slightly, no doubt, from either the shipments or sales.

ALL FERTILIZERS

The consumption of the two classes of fertilizers, mixtures and materials, is summarized by States and regions in Table 1. Regional gains in the consumption of all fertilizers occurred in the New England, Middle Atlantic, Mountain, and Pacific regions and the Territories. Total use in these areas was 473,994 tons greater than in 1953-54. More than one-half of the gain was in California. The South Atlantic and the four Central Regions showed a combined decrease of 523,788 tons; of which more than one-half was in Illinois.

Consumption in each of 27 States, the District of Columbia, and both the Territories, representing 44.18 percent of the total tonnage in 1954-55 in the United States, was higher than that of the preceding year.

Compared with the tonnages for each six-month period of 1953-54, most of the increase in total consumption of all fertilizers in 1954-55 occurred in the July-December period. Consumption for this period in 1954-55 was 147,409 tons (2.47 percent) above that for the corresponding period of 1953,54, while for the January-June period consumption was 197,203 tons (1.17 percent) below the quantity for the same period of 1953-54.

In Table 1, the percentage change in consumption of fertilizers in 1954-55 as compared with 1953-54 is based on the tonnage of primary nutrient fertilizers only, in order that a direct comparison may be made with the percentage change in consumption of the primary nutrients themselves.

Regional distribution of the consumption of fertilizer between mixtures and materials in 1953-54 and 1954-55 is shown in Table 1a, as percentages of the country totals.

MIXTURES

Mixed fertilizers consumed in the United States and Territories amounted to 15,347,850 tons, as compared with 15,541,076 tons in 1953-54. The quantity of mixtures comprised 67.54 percent of the total fertilizer tonnage in 1954-55, as compared with an average of 67.28 percent for the preceding five-year period. In 1954-55, there were 1,750 grades designated by their guaranteed analyses, an increase of 431 over those so designated in 1953-54. This difference is largely the result of the more complete reporting of mixtures by specified grades in 1954-55 than in 1953-54. Among the individual States, the total number of grades designated by their guaranteed analysis ranged from 21 for New Mexico to 849 for Florida.

Consumption of individual grades of mixtures in total quantities of 2,700 tons or more in the Continental United States is shown in Table 2. In 1954-55, there were 176 of these grades totaling 14,558,704 tons and

Table 2a—Fifteen Principal Grades of Mixed Fertilizers Consumed in Continental United States, Year Ended June 30, 1955, Compared with June 30, 1954.

Grade	Consumption		Proportion of Total Consumption of Mixtures in Continental United States	
	1953-54	1954-55	1953-54	1954-55
	Tons	Tons	Percent	Percent
3-12-12	1,730,944	1,413,525	11.34	9.38
5-10-10	1,287,746	1,379,753	8.44	9.16
5-10-5	821,116	764,044	5.38	5.07
10-10-10	701,365	725,133	4.60	4.81
4-16-16	698,177	702,756	4.58	4.66
4-10-7	552,416	640,994	3.62	4.26
5-20-20	300,808	564,263	1.97	3.74
4-12-12	370,014	501,692	2.43	3.33
3-9-6	608,256	494,506	3.99	3.28
3-9-9	489,239	494,438	3.21	3.28
2-12-12	404,036	438,393	2.65	2.91
4-10-6	498,719	424,671	3.27	2.82
0-20-20	343,162	341,795	2.25	2.27
12-12-12	208,922	306,858	1.37	2.04
4-8-8	393,334	280,857	2.58	1.86
Total	9,408,254	9,473,678	61.68	62.87

accounting for 96.62 percent of the total quantity of mixtures. Other designated grades numbered 1,462, totaling 381,336 tons and accounted for 2.53 percent of the quantity of mixtures. The balance of 128,147 tons (0.85 percent) were reported under unspecified designations.

Consumption of mixtures in Hawaii and Puerto Rico totaled 279,663 tons in 164 grades (all specified). While many of the grades in Puerto Rico are similar to those used on the Continent, most of those in Hawaii are designated in fractional numbers.

The tonnages of the 15 grades most used in the Continental United States are shown in Table 2a. These grades accounted for 60 percent or more of the total tonnage of mixtures consumed in the Continental United States in both 1953-54 and 1954-55. Grades 3-12-12, 5-10-10, 5-10-5, 10-10-10, and 4-16-16 were the grades consumed in largest tonnage in both years, in the order named.

The tonnages of the 15 principal grades consumed in each of the continental regions and Puerto Rico in 1954-55 are shown in Table 3, together with the quantities for each State in the region. Excepting California, Washington, Wyoming, and the District of Columbia, these grades accounted for 50 percent or more of the consumption of mixtures in each of the States and Puerto Rico.

The consumption of mixtures by classes (N-P-K, N-P, P-K, N-K) for each region and the United States is shown in Table 5. Except for the Mountain region, N-P-K mixtures were favored over the other classes. More than 76 percent of the tonnage of all mixtures consumed in each of the other regions was of this class, while in the Mountain region consumption of N-P-K and N-P mixtures were nearly equally divided. For the United States, 91.04 percent of the tonnage of all mixtures was of the N-P-K class, while for the other classes—N-P, P-K, N-K—consumption was 2.26 percent, 5.25 percent, and 1.45 percent of the total tonnage, respectively.

The national weighted average of total primary nutrients contained in mixtures increased from 26.87 percent in 1953-54 to 27.90 percent in 1954-55 (Table 7). The average, for 1954-55, comprised nitrogen, 5.24; available P_2O_5, 11.86; and K_2O, 10.80 percent. The average percentages of these nutrients in 1953-54 were 5.01, 11.54 (revised), and 10.32 (revised), respectively. As compared with 1953-54, the increases in these

Table 2—Consumption of Principal Mixed Fertilizers in the Continental United States, By Grades, Year Ended June 30, 1954 and 1955

Grade	Consumption[1]		Proportion of Total	
	1952-54	1954-55	1953-54	1954-55
	Tons	Tons	Per-cent	Per-cent
0-8-24	5,468	5,115	0.04	0.03
0-9-27	15,510	16,885	.10	.11
0-10-10	4,367	2,965	.03	.02
0-10-20	49,130	55,695	.32	.37
0-10-30	45,006	45,605	.30	.30
0-10-45	3,769	3,228	.02	.02
0-12-12	66,343	28,720	.43	.19
0-12-20	20,121	11,983	.13	.08
0-12-24	2,976	2,791	.02	.02
0-12-36	8,554	7,691	.06	.05
0-14-5	4,611	3,296	.03	.02
0-14-7	32,590	7,047	.21	.05
0-14-10	8,200	5,108	.05	.03
0-14-14	177,499	129,982	1.16	.86
0-15-30	17,998	16,380	.12	.11
0-15-45	332	3,154	[2]	.02
0-16-8	12,881	25,190	.08	.17
0-20-10	22,905	16,079	.15	.11
0-20-20	343,162	341,795	2.25	2.27
0-24-24	924	7,522	.01	.05
0-25-25	20	10,333	[2]	.07
0-30-15	5,525	9,255	.04	.06
0-30-30	11,055	18,623	.07	.12
2-10-8	8,044	6,173	.05	.04
2-12-6	81,034	44,391	.53	.29
2-12-12	404,036	438,393	2.65	2.91
3-8-5	4,302	2,813	.03	.02
3-8-8	12,743	12,084	.08	.08
3-9-6	608,256	494,506	3.99	3.28
3-9-9	489,239	494,438	3.21	3.28
3-9-12	28,981	28,624	.19	.19
3-9-15	9,308	11,291	.06	.07
3-9-18	113,702	80,324	.75	.53
3-9-27	123,964	109,446	.81	.73
3-10-12	6,209	4,602	.04	.03
3-12-6	278,396	210,639	1.82	1.40
3-12-12	1,730,944	1,413,525	11.34	9.38
3-18-9	72,765	50,074	.48	.33
4-4-2	50	3,013	[2]	.02
4-6-6	15,583	11,965	.10	.08
4-6-8	48,399	43,472	.32	.29
4-7-5	130,530	117,706	.86	.78
4-8-4	13,987	12,799	.09	.08
4-8-6	320,689	248,738	2.10	1.65
4-8-8	393,334	280,857	2.58	1.86
4-8-10	87,500	97,526	.57	.65
4-8-12	51,841	56,399	.34	.37
4-9-3	76,442	69,566	.50	.46
4-10-6	498,719	424,671	3.27	2.82
4-10-7	552,416	640,994	3.62	4.26
4-10-10	9,513	8,649	.06	.06
4-12-4	142,517	104,024	.93	.69
4-12-8	152,806	149,971	1.00	1.00
4-12-12	370,014	501,692	2.43	3.33
4-12-16	2,651	3,514	.02	.02
4-16-8	52,456	30,901	.34	.21
4-16-16	698,177	702,756	4.58	4.66
4-24-12	55,070	38,088	.36	.25
5-3-2	1,775	3,076	.01	.02
5-3-6	3,640	3,802	.02	.03
5-5-5	2,564	6,912	.02	.05
5-5-8	8,208	6,551	.05	.04
5-6-6	2,702	3,535	.02	.02
5-6-8	7,363	12,764	.05	.08
5-7-5	24,068	21,400	.16	.14
5-8-7	16,840	14,311	.11	.10
5-8-8	4,630	3,653	.03	.02
5-10-5	821,116	764,044	5.38	5.07
5-10-10	1,287,746	1,379,753	8.44	9.16
5-10-15	89,404	111,158	.59	.74
5-10-20	7,819	8,761	.05	.06
5-15-10	10,040	7,718	.07	.05
5-15-15	17,319	18,010	.11	.12
5-15-30	4,747	5,310	.03	.04
5-20-10	44,710	55,880	.29	.37
5-20-20	300,808	564,263	1.97	3.74
6-3-6	26,182	23,415	.17	.16
6-4-6	11,047	15,292	.07	.10
6-4-8	21,204	38,744	.14	.26
6-6-6	81,077	77,092	.53	.51
6-6-8	14,169	16,469	.09	.11
6-6-9	452	2,825	[2]	.02
6-6-12	11,669	11,492	.08	.08
6-6-18	11,874	13,616	.08	.09
6-7-7	5,672	4,757	.04	.03
6-8-2	3,929	2,938	.03	.02
6-8-4	168,852	123,438	1.11	.82
6-8-6	195,320	159,826	1.28	1.06
6-8-8	288,134	264,922	1.89	1.76
6-8-12	40,244	23,125	.26	.15
6-9-3	5,534	5,708	.04	.04
6-9-6	11,053	8,983	.07	.06
6-9-9	8,271	6,329	.05	.04
6-9-12	54,609	51,069	.36	.34
6-9-27	3,035	2,763	.02	.02
6-10-4	57,216	71,995	.37	.48
6-10-8	2,064	3,629	.01	.02
6-12-4	3,383	3,278	.02	.02
6-12-6	51,806	51,456	.34	.34
6-12-12	185,274	280,573	1.21	1.86
6-20-20	4,533	4,501	.03	.03
6-24-0	21,535	13,397	.14	.09
6-24-12	43,087	65,377	.28	.43
6-24-24	13,356	22,433	.09	.15
6-36-0	556	3,145	[2]	.02
7-7-7	36,428	29,851	.24	.20
7-8-8	3,183	5,705	.02	.04
7-9-9	2,546	3,366	.02	.02
7-14-7	3,614	2,733	.02	.02
8-0-8	16,084	16,007	.11	.11
8-0-12	6,625	6,465	.04	.04
8-0-24	20,088	20,395	.13	.14
8-2-8	269	2,998	[2]	.02
8-4-8	37,279	41,629	.24	.28
8-5-7	15	3,257	[2]	.02
8-6-4	5,443	5,610	.04	.04
8-6-6	3,339	4,159	.02	.03
8-6-8	7,545	3,721	.05	.02
8-6-9	0	3,200	.00	.02
8-6-12	281	3,134	[2]	.02
8-8-4	20,037	19,033	.13	.13
8-8-8	254,471	226,634	1.67	1.50
8-9-10	5,876	7,641	.04	.05
8-10-12	11,742	11,976	.08	.08
8-12-2	0	3,140	.00	.02
8-12-12	27,833	39,478	.18	.26
8-12-16	17,021	17,501	.11	.12
8-16-8	7,062	5,860	.05	.04
8-16-16	94,752	126,175	.62	.84
8-24-8	101,509	85,837	.66	.57
8-24-12	6,583	9,418	.04	.06
8-32-0	72,178	63,110	.47	.42
9-6-6	6,921	10,089	.05	.07
9-6-9	2	3,650	[2]	.02
9-9-9	2,295	3,879	.02	.03
9-36-0	2,522	3,324	.02	.02
10-0-10	44,797	29,688	.29	.20
10-0-12	2,539	4,714	.02	.03
10-4-10	5,687	3,753	.04	.02
10-5-5	2,559	3,067	.02	.02
10-5-10	640	4,262	[2]	.03
10-6-4	35,258	40,540	.23	.27
10-6-10	379	3,210	[2]	.02
10-10-0	8,007	8,703	.05	.06
10-10-5	30,971	23,529	.20	.16
10-10-10	701,365	725,133	4.60	4.81
10-15-15	2,893	4,824	.02	.03
10-16-8	9,948	7,661	.07	.05
10-20-0	117,049	102,526	.77	.68
10-20-5	2,208	2,805	.01	.02
10-20-10	48,714	86,642	.32	.58
10-20-20	9,088	15,143	.06	.10
10-30-10	3,624	5,211	.02	.03
11-8-4	20	3,131	[2]	.02
12-0-8	2,094	3,275	.01	.02
12-0-10	14,146	19,820	.09	.13
12-0-12	5,148	5,965	.03	.04
12-0-15	259	3,760	[2]	.02
12-6-6	3,583	5,683	.02	.04
12-12-6	3,758	3,704	.02	.03
12-12-12	208,922	306,858	1.37	2.04
12-24-0	11,743	8,272	.08	.06
12-24-12	31,354	27,327	.21	.18
13-13-13	24,136	31,459	.16	.21
14-0-14	38,892	46,804	.25	.31
14-14-14	2,852	33,782	.02	.22
15-0-12	4,437	3,549	.03	.02
15-0-15	1,021	4,043	.01	.03
15-8-4	8,451	6,731	.06	.05
15-15-0	58,402	55,637	.38	.37
15-20-0	2,082	2,706	.01	.02
15-30-0	0	2,958	.00	.02
16-8-8	610	3,313	[2]	.02
16-10-0	6,558	7,775	.04	.05
17-7-0	19,706	17,813	.13	.12
20-0-20	4,447	7,399	.03	.05
176 Grades	**14,756,109**	**14,558,704**	**96.71**	**96.62**
Other Specified Grades	**378,404**	**381,336**[3]	**2.48**	**2.53**
Grades not specified	**123,540**	**128,147**	**.81**	**0.85**
Total[4]	**15,258,053**	**15,068,187**	**100.00**	**100.00**

[1] Grades consumed in amounts of 2,700 tons or more in 1954-55 and their consumption in 1953-54. This accounts for differences in the 1953-54 sub-totals which as originally reported consisted of grades consumed in amounts of 2,500 tons or more.
[2] Less than 0.005 percent.
[3] 1,462 grades.
[4] Does not include the quantity of mixtures consumed in the Territories.

Table 3—Consumption of Mixed Fertilizers, by Grades in Each State and Region, Year Ended June 30, 1955

State	Fifteen Principal Grades Consumed in Region, Tons															All Other Grades		Total Tons
																Number[1]	Tons	
New England																		
	5-10-10	6-9-12	8-12-12	8-16-16	6-3-6	10-10-10	8-12-16	5-8-7	0-20-20	7-7-7	8-9-10	0-15-30	5-10-5	6-8-8	6-9-9			
Maine	15,749	50,336	34,688	12,796	0	7,630	17,490	2,949	1,097	844	7,641	155	378	0	6,309	37	16,949	175,011
New Hampshire	3,696	0	342	3,739	0	1,280	0	854	905	633	0	1,040	97	0	0	24	1,256	13,842
Vermont	7,082	0	90	5,543	9	2,666	0	194	7,903	627	0	3,728	58	0	0	27	2,776	30,676
Massachusetts	16,411	0	756	4,827	6,957	6,025	0	5,991	1,082	5,015	0	734	2,780	1,829	0	23	15,609	68,016
Rhode Island	7,073	0	1,007	197	0	325	11	837	265	925	0	83	227	329	0	27	3,322	14,601
Connecticut	9,010	0	1,252	2,345	16,289	4,280	0	3,364	2,058	3,063	0	1,797	3,844	4,615	0	52	10,898	62,915
Total	59,021	50,336	38,135	29,447	23,255	22,306	17,501	14,189	13,310	11,107	7,641	7,537	7,384	6,773	6,309	68	50,810	365,061
Middle Atlantic																		
	5-10-10	5-10-5	3-12-6	10-10-10	8-16-16	0-20-20	6-12-6	4-8-12	6-12-12	4-12-12	2-12-12	8-8-8	0-14-14	3-12-12	5-10-15			
New York	163,612	139,372	13,617	62,852	26,391	12,675	36,542	5,976	16,870	9	44	5,842	1,761	2,987	13,069	76	42,547	544,166
New Jersey	141,556	25,358	2,390	8,945	1,549	2,967	1,730	422	3,797	85	105	16,384	3,189	1,517	633	64	50,066	260,693
Pennsylvania	273,953	31,171	97,856	55,855	18,993	27,165	2,153	9,603	6,195	23,458	6,590	3,865	8,880	11,329	2,686	88	50,298	630,050
Delaware	43,475	2,109	1,953	6,128	3,694	2,094	25	2,114	2,505	1,832	4,296	540	3,479	2,240	5,601	52	8,354	90,439
Dist. of Columbia	14	890	20	2	0	0	0	10	6	0	0	16	0	0	0	18	1,125	2,083
Maryland	93,264	27,480	51,465	15,975	4,141	5,222	0	16,842	2,423	6,366	16,170	2,285	7,236	7,572	1,017	79	40,560	298,018
West Virginia	30,012	3,235	15,258	3,063	209	4,645	0	0	594	76	2,612	17	2,074	396	38	38	11,205	73,434
Total	745,886	229,615	182,559	152,820	54,977	54,768	40,450	34,967	32,390	31,826	29,817	28,949	26,619	26,041	23,044	152	204,155	1,898,883
South Atlantic																		
	3-9-9	4-10-6	4-12-12	2-12-12	3-9-6	5-10-10	4-8-8	4-8-6	5-10-5	4-7-5	6-8-6	4-8-10	3-12-12	6-6-6	4-9-3			
Virginia	41,255	134	7,959	194,275	54,654	130,899	1	0	72,058	0	12,518	6,528	32	0	5,679	48	171,987	697,979
North Carolina	159,291	270,795	3,830	185,165	300,661	201,778	0	0	15,793	0	60,509	73,072	0	0	50,859	27	160,783	1,482,536
South Carolina	199,686	153,328	23,799	0	43,125	19,104	28,736	0	45,692	0	5,446	0	82,161	0	0	22	43,978	645,055
Georgia	85,378	182	369,122	20,087	3,157	10,281	156,217	203,979	5,290	40	28,829	0	1,447	0	5,828	97	106,887	996,724
Florida	7,227	232	14,169	3,905	10	4,447	76,382	44,619	6,124	117,666	6,068	17,847	2,250	76,813	7,197	834	720,987	1,105,943
Total	492,837	424,671	418,879	403,432	401,607	366,509	261,336	248,598	144,957	117,706	113,370	97,447	85,890	76,813	69,563	868	1,204,622	4,928,237
East North Central																		
	3-12-12	4-16-16	5-20-20	10-10-10	0-20-20	5-10-10	12-12-12	3-9-27	3-18-9	0-10-30	3-9-18	6-12-12	8-16-16	10-6-4	14-14-14			
Ohio	460,886	60,521	88,397	80,328	36,998	128,177	22,894	988	15,148	1,879	7,971	15,359	18,436	11,733	2,350	59	61,113	1,013,188
Indiana	251,957	287,115	106,173	129,755	59,444	4,785	30,813	31,838	7,659	14,566	5,947	5,750	2,224	1,106	10,672	79	40,846	990,650
Illinois	109,927	112,032	40,987	109,453	26,793	377	32,637	35,538	1,334	4,193	4,669	4,478	354	993	3,814	75	47,890	535,469
Michigan	179,813	119,860	81,326	35,326	21,746	7,740	42,887	2,737	24,463	4,051	7,071	8,078	677	6,427	0	63	42,978	585,180
Wisconsin	88,249	59,102	76,058	34,765	41,778	0	2,611	19,935	1,009	19,701	14,669	2,299	1,508	91	762	53	34,621	397,158
Total	1,090,832	638,630	392,941	389,627	186,759	141,079	131,842	91,036	49,613	44,390	40,327	35,974	23,199	20,350	17,598	139	227,448	3,521,645
West North Central																		
	5-20-20	12-12-12	10-10-10	8-24-8	3-12-12	10-20-0	6-24-12	8-32-0	0-20-20	4-16-16	5-20-10	4-12-4	15-15-0	8-8-8	4-24-12			
Minnesota	59,869	325	12,718	68	2,959	3,742	51,764	9,025	24,448	31,349	7,648	0	684	8	13,268	66	60,560	278,435
Iowa	89,712	25,684	34,689	1,408	15,717	27,160	2,606	21,167	12,629	14,655	41,414	156	11,791	50	141	170	69,199	368,178
Missouri	6,983	111,354	33,262	61,313	55,676	1,599	0	44	17,155	8,614	19	42,933	900	41,606	10,392	37	63,767	455,617
North Dakota	365	46	495	0	264	302	3,880	9,934	102	480	157	0	186	0	1,072	34	6,403	23,686
South Dakota	54	63	219	16	3	7,255	231	2,175	54	2	22	0	2,482	0	6	52	3,556	16,138
Nebraska	127	843	228	488	10	8,068	1	7,915	603	26	216	65	9,582	1	320	74	19,499	47,992
Kansas	280	1,673	1,157	17,937	688	24,490	33	6,755	482	108	43	4,715	19,820	315	333	34	15,520	94,349
Total	157,390	139,988	82,768	81,230	75,317	72,616	58,515	57,015	55,473	55,234	49,519	47,869	45,445	41,980	25,532	236	238,504	1,284,395
East South Central																		
	4-10-7	6-8-8	6-12-12	5-10-5	6-8-4	3-12-12	3-9-6	5-10-15	4-12-8	4-12-12	5-10-10	6-8-6	2-12-6	0-14-14	8-8-8			
Kentucky	0	961	10,033	1,610	2	62,715	22,932	70,590	52,296	244	23,517	38,644	34,168	1,172	6,065	65	89,926	414,875
Tennessee	823	4,403	168,217	4,496	2,576	29,066	69,930	6,893	8,276	1,861	15,949	1,290	2,454	279	4,965	88	88,068	409,546
Alabama	579,260	52,784	33	1,981	109,339	0	14	0	0	48,413	0	123	0	28,462	5,807	38	36,327	862,543
Mississippi	6,324	154,734	328	113,170	6,490	1,148	0	0	0	2	7,910	0	0	4,473	10,312	29	20,991	325,882
Total	586,407	212,882	178,611	121,257	118,407	92,929	92,876	77,483	60,572	50,520	47,376	40,057	36,622	34,386	27,149	141	235,312	2,012,846
West South Central																		
	5-10-5	10-20-10	8-8-8	3-12-12	4-12-4	12-12-12	6-8-12	12-24-12	10-20-0	3-9-18	13-13-13	6-8-8	5-10-10	6-10-4	15-15-0			
Arkansas	47,729	13,276	3,505	3,249	2,512	7,709	20,970	1,010	420	12,713	2,355	98	1,775	30	0	62	38,947	156,298
Louisiana	32,492	3,140	35,976	26,202	11,700	12,657	580	1,897	4	72	4,291	13,115	3,654	1,211	829	55	24,311	172,131
Oklahoma	26,375	9,866	529	930	5,884	331	3	2,694	4,694	1,017	330	76	2,018	845	216	46	13,405	69,213
Texas	136,141	35,387	20,352	10,883	10,787	3,093	332	12,600	13,072	45	6,629	181	5,535	7,245	7,649	98	40,609	310,540
Total	242,737	61,669	60,362	41,264	30,883	23,790	21,885	18,201	18,190	13,847	13,605	13,470	12,982	9,331	8,694	157	117,272	708,182
Mountain																		
	10-20-0	12-24-0	6-10-4	10-20-5	10-10-10	10-10-0	10-16-8	20-20-0	12-15-0	27-14-0	15-15-0	10-18-5	14-7-0	20-10-0	15-11-0			
Montana	1,763	0	211	0	0	0	0	0	0	0	0	213	0	0	0	20	821	3,008
Idaho	621	0	226	0	13	198	435	0	1,417	0	0	432	0	3	1,337	27	720	5,422
Wyoming	235	321	30	0	0	0	0	0	26	0	5	40	0	1	0	19	1,348	2,006
Colorado	332	2,956	728	0	814	0	1,101	67	0	0	213	622	0	24	0	56	6,596	13,453
New Mexico	266	0	119	0	28	73	4	0	0	0	810	0	216	0	0	14	614	2,130
Arizona	4,083	0	500	2,435	1,189	1,768	0	1,520	77	989	420	0	1,196	1,321	0	32	5,451	20,949
Utah	851	0	1,086	0	6	0	78	0	42	500	0	96	0	0	2	30	984	3,645
Nevada	127	0	233	0	1	0	0	0	0	0	0	0	0	0	0	20	325	686
Total	8,278	3,277	3,133	2,435	2,051	2,039	1,618	1,587	1,562	1,489	1,448	1,423	1,412	1,349	1,339	122	16,859	51,299
Pacific																		
	10-10-5	17-7-0	8-8-4	10-10-10	6-10-4	8-10-12	16-10-0	15-8-4	10-16-8	5-10-10	4-10-10	6-20-20	11-8-4	10-20-20	4-4-2			
Washington	487	0	0	836	4,158	0	0	0	294	4,382	0	2,306	0	2,531	0	96	20,089	35,083
Oregon	81	0	0	632	1,198	0	0	27	5,747	1,377	0	2,137	0	524	0	37	10,572	22,295
California	19,885	17,763	16,473	14,620	6,936	9,058	7,011	6,555	0	0	5,488	0	3,115	0	3,013	797	130,344	240,261
Total	20,453	17,763	16,473	16,088	12,292	9,058	7,011	6,582	6,041	5,759	5,488	4,443	3,115	3,055	3,013	852	161,005	297,639
Territories[2]																		
	14-4-10	14-2-8	15-4-7	12-6-10	12-4-10	8-6-10	13-3-12	6-8-10	12-3-16	10-10-8	10-6-14	10-10-5	9-10-5	16-4-5	12-2-10			
Puerto Rico	34,455	24,355	20,424	16,842	13,218	12,612	12,364	11,858	8,191	7,742	7,626	5,811	4,916	4,536	3,843	24	29,271	218,064

[1] The number of mixtures shown for each State and Region is exclusive of mixtures not specified by grade, although their tonnages are included in the totals.
[2] The total consumption in Hawaii was 61,659 tons of mixed goods, comprising 127 grades, which were manufactured to consumer's specifications. Data for Alaska not available. In 1952-53, the number of mixtures reported for Alaska were nine, totaling 136 tons.

averages were 4.59 per cent for nitrogen, 2.77 percent for available P_2O_5, and 4.65 percent for K_2O. The average primary nutrient content of all mixtures consumed in each State and Territory is shown in Table 7. These averages for the 51 political units showed for nitrogen, increases or no change in 39 and decreases in 12; for available P_2O_5, increases in 36 and decreases in 15; for K_2O, increases in 44 and de-

Table 4—Principal Fertilizer Materials Consumed as Such, Year Ended June 30, 1955[1] (in Tons)

State & Region	Chemical Nitrogen Materials										Phosphate Materials[2]				Potash Materials			
											Superphosphates							
	Am-Monia (Anhydrous)	Ammonium Nitrate	Ammonium Nitrate-Limestone Mixtures	Ammonium Sulfate	Calcium Cyanamide	Nitrogen Solutions & Aqua Ammonia[2]	Sodium Nitrate	Urea	Other[2]	Natural Organics[2]	Phosphate Rock[3]	Grades 22 Percent and Under	Grades Over 22 Percent	Other	Chlorides 50-60 Percent Grades	Other[2]	Total Primary Nutrient Materials	Secondary and Trace Element Materials[2]
Maine	0	1,222	13	54	269	24	135	81	2	1,616	67	3,708	0	132	20	20	7,263	38
New Hampshire	0	939	2	26	50	0	160	3	6	697	2	2,488	4	85	78	28	4,568	33
Vermont	0	535	80	10	7	0	64	79	15	358	140	16,067	5	42	338	31	17,771	42
Massachusetts	0	1,221	19	90	222	0	1,013	88	10	8,557	258	4,585	0	664	466	21	17,214	125
Rhode Island	0	102	2	69	98	0	93	8	3	1,059	53	304	0	77	77	4	1,949	8
Connecticut	14	692	15	36	234	2	601	52	4	15,178	160	5,152	115	1,057	1,049	1,055	25,416	150
New England	14	4,611	131	285	880	26	2,066	311	40	27,465	680	32,304	124	2,057	2,028	1,159	74,181	396
New York	26	12,404	977	346	3,679	758	4,815	1,016	128	15,090	2,029	40,236	1,147	1,255	734	605	85,245	892
New Jersey	388	3,094	628	144	2,028	473	2,920	166	120	6,680	879	4,643	869	1,094	1,125	119	25,370	273
Pennsylvania	615	7,813	408	4,182	3,418	451	2,087	435	157	9,936	5,584	31,617	3,525	10,110	1,086	553	81,977	2,591
Delaware	238	1,715	283	6	577	543	108	28	0	649	52	593	1	130	152	0	5,075	121
Dist. of Columbia	0	1	0	7	0	4	18	0	0	602	32	28	0	48	2	0	742	0
Maryland	639	1,830	602	144	1,520	1,260	3,378	186	15	1,611	1,810	5,052	70	662	281	295	19,355	230
West Virginia	84	1,116	186	295	8	0	1,436	40	8	480	151	4,234	61	82	103	1	8,285	15
Middle Atlantic	1,990	27,973	3,084	5,124	11,230	3,489	14,762	1,871	428	35,048	10,537	86,403	5,673	13,381	3,483	1,573	226,049	4,122
Virginia	814	6,058	26,217	79	1,915	2,393	26,822	86	617	1,311	2,669	9,717	65	1,271	2,007	16,044	98,085	21,190
North Carolina	7,420	10,719	114,335	172	9,519	7,054	122,172	404	0	2,343	1,457	18,783	170	6,418	10,681	6,815	318,462	27,655
South Carolina	552	22,324	92,311	571	1,652	1,878	101,627	106	0	635	1,360	20,905	4	9,035	22,085	6,089	281,134	3,036
Georgia	6,759	42,124	58,492	1,028	1,947	1,876	96,596	469	19	1,656	2,024	27,654	172	8,016	8,954	4,176	261,962	17,328
Florida	452	13,951	5,951	2,820	1,830	500	21,793	3,862	13,186	9,292	14,167	6,842	127	4,600	2,811	17,413	119,597	3,865
South Atlantic	15,997	95,176	297,306	4,670	16,863	13,701	369,010	4,927	13,822	15,237	21,677	83,901	538	29,340	46,538	50,537	1,079,240	73,074
Ohio	3,020	17,078	241	7,198	974	1,726	1,015	1,314	22	9,048	6,847	14,867	3,247	1,617	2,750	672	71,636	514
Indiana	10,638	51,372	575	5,645	1,592	6,261	165	4,188	122	3,816	18,359	8,434	13,657	1,986	34,060	822	161,592	448
Illinois	17,315	46,089	1,633	42,058	231	10,560	33	2,201	74	12,642	370,775	50,832	28,825	9,899	80,844	158	674,169	962
Michigan	1,589	12,612	152	6,267	288	858	444	1,572	358	13,225	3,150	9,137	994	1,213	703	444	52,946	469
Wisconsin	2,815	7,069	27	239	13	315	9	101	2	6,665	7,806	2,289	564	294	3,860	521	32,589	256
East North Central	35,377	134,220	2,628	61,407	2,938	19,720	1,666	9,376	578	45,396	406,937	85,559	47,287	15,009	122,217	2,617	992,932	2,649
Minnesota	15,474	10,608	170	1,967	0	8,457	0	87	3	5,336	2,729	7,286	28,610	10,991	2,243	1	93,962	274
Iowa	17,882	54,504	175	1,159	182	11,126	30	1,429	7	3,353	16,663	43,262	23,226	31,264	12,141	406	216,799	75
Missouri	14,978	58,326	3,450	1,650	67	3,476	140	503	202	3,805	105,307	5,287	6,805	5,774	17,080	358	227,208	88
North Dakota	134	579	0	87	0	141	0	34	0	64	40	127	19,555	18,408	52	0	39,221	103
South Dakota	1,695	4,680	2	168	0	394	0	269	1	426	60	707	7,302	6,046	13	0	21,763	0
Nebraska	22,766	68,604	150	544	0	13,815	0	2,059	0	4,084	3,471	4,619	24,682	14,826	213	0	159,833	388
Kansas	8,523	48,207	5	386	0	326	0	346	0	1,181	3,583	5,162	28,701	42,599	1,057	0	140,076	114
West North Central	81,452	245,508	3,952	5,961	249	37,735	170	4,727	213	18,249	131,853	66,450	138,881	129,898	32,799	765	898,862	1,042
Kentucky	795	26,219	149	308	1,647	224	1,667	214	7	447	6,997	33,167	2,737	14,738	10,146	8,229	107,691	152
Tennessee	4,573	42,721	444	194	3,119	0	16,146	1,062	0	1,035	694	13,261	5,659	14,794	13,966	4,375	122,043	222
Alabama	2,300	75,559	38,780	1,080	1,693	1,277	92,328	149	20	530	2,179	25,338	167	45,948	8,696	122	296,166	1,097
Mississippi	40,811	146,384	9,195	2,034	8,784	0	59,633	152	14	31	2,836	28,664	1,747	73,341	21,426	269	395,321	451
East South Central	48,479	290,883	48,568	3,616	15,243	1,501	169,774	1,577	41	2,043	12,706	100,430	10,310	148,821	54,234	12,995	921,221	1,922
Arkansas	15,026	65,578	747	8,479	9,052	24	24,593	2,541	62	189	287	8,748	8,365	2,425	29,751	635	176,502	7
Louisiana	23,757	41,279	1,239	7,072	3,526	4,116	30,003	744	491	524	1,790	19,599	1,044	7,667	5,571	39	148,461	167
Oklahoma	1,794	9,250	0	662	1	0	675	169	0	1,123	5,416	21,651	6,692	9,180	1,089	0	57,702	32
Texas	27,158	33,025	31	40,751	973	4,218	1,711	2,886	4	6,573	8,144	60,828	28,429	59,558	1,002	60	275,351	448
West South Central	67,735	149,132	2,017	56,964	13,552	8,358	56,982	6,340	557	8,409	15,637	110,826	44,530	78,830	37,413	734	658,016	654
Montana	225	3,030	0	1,154	0	0	0	61	0	125	0	176	12,448	3,010	24	0	20,253	425
Idaho	3,960	20,185	0	31,463	175	1,897	30	170	438	227	0	16,267	14,659	7,051	114	0	96,636	4,355
Wyoming	206	848	0	299	0	0	0	238	0	11	0	342	5,339	1,039	36	0	8,358	731
Colorado	2,636	7,032	87	2,812	4	527	0	556	0	761	33	720	13,926	5,203	200	204	34,701	578
New Mexico	4,552	1,832	0	896	0	0	3	1,500	0	1,109	0	5,565	10,743	4,177	47	30	30,454	0
Arizona	9,941	11,401	0	28,909	940	14,153	793	9,914	6,201	10,357	0	5,328	4,615	27,988	508	282	131,330	19,656
Utah	1,675	5,636	0	4,617	0	2	0	98	0	1,037	0	3,034	6,269	1,526	73	0	23,967	251
Nevada	10	6	0	254	0	40	9	8	0	84	0	52	407	245	2	1	1,118	1,377
Mountain	23,205	49,970	87	70,404	1,119	16,619	835	12,545	6,639	13,711	33	31,484	68,406	50,239	1,004	517	346,817	27,373
Washington	18,289	33,981	250	32,573	217	21,936	182	890	2,714	2,125	583	8,817	8,537	14,957	2,354	1,597	150,002	13,731
Oregon	7,069	26,769	0	42,166	560	3,327	33	1,672	4,343	928	64	11,568	2,720	26,386	1,419	3,653	132,677	17,276
California	51,518	57,135	0	163,025	6,031	169,599	221	15,844	29,811	292,376[4]	2,481	61,474	14,541	88,023	1,268	4,520	957,867	635,685
Pacific	76,876	117,885	250	237,764	6,808	194,862	436	18,406	36,868	295,429	3,128	81,859	25,798	129,366	5,041	9,770	1,240,546	666,692
Continental U. S.	351,125	1,115,358	358,023	446,195	68,882	296,011	615,701	60,080	59,186	460,987	603,188	679,216	341,547	596,941	304,757	80,667	6,437,864	777,924
Hawaii	0	0	0	13,771	0	42,833	135	8,472	68	113	1,465	6,154	379	3,622	13,826	1,713	92,551	2,384
Puerto Rico	2,556	0	0	60,002	0	1,730	6	33	0	0	0	352	14	318	74	47	65,132	0
Alaska[5]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Territories	2,556	0	0	73,773	0	44,563	141	8,505	68	113	1,465	6,506	393	3,940	13,900	1,760	157,683	2,384
Total: 1954-55	353,681	1,115,358	358,023	519,968	68,882	340,574	615,842	68,585	59,254	461,100	604,653	685,722	341,940	600,881	318,657	82,427	6,595,547	780,308
1953-54	350,474	924,736	390,603	536,716	68,213	191,592	653,105	[6]	144,964	420,068	912,676	786,927	247,142	598,141	309,735	81,818	6,616,910	615,513
1952-53	217,182	846,252	419,845	534,749	82,219	72,917	647,483	[6]	166,652	359,037	1,176,962	1,046,827	248,850	636,996	282,465	74,461	6,812,897	877,487

[1] Includes materials distributed by Government agencies. Excludes lime and the quantities of materials used for manufacture of commercial mixtures.
[2] The principal commodities are shown in Table 5, by regions.
[3] Includes colloidal phosphate the quantity of which is shown separately by regions, in Table 5.
[4] Includes an estimated 240,000 tons of dried manures.
[5] Not available.
[6] Withheld to avoid disclosing figures for individual establishments.

Table 5—Kinds of Fertilizers Consumed in Regions of the United States, During Year Ended June 30, 1955[1] (in tons)

Kinds	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Territories[2]	Total
MIXTURES: N-P-K	339,310	1,800,743	4,552,714	3,228,363	982,410	1,908,719	642,586	23,273	244,320	249,369	13,972,007
N-P	7	93	1,247	5,811	217,240	98	41,110	27,905	50,060	3,726	347,297
P-K	25,544	97,944	176,637	287,309	84,612	103,359	24,486	121	1,684	3,641	805,337
N-K	0	103	197,639	162	133	670	0	0	1,575	22,927	223,209
CHEMICAL NITROGEN MATERIALS											
Ammonia, anhydrous	14	1,990	15,997	35,377	81,452	48,479	67,735	23,205	76,876	2,556	353,681[3]
Ammonia, aqua: 20-25% N.	0	0	0	154	101	0	4,140	9,982	172,868	44,563	231,808[4]
Ammonium nitrate	4,611	27,973	95,176	134,220	245,508	290,883	149,132	49,970	117,885	0	1,115,358
Ammonium nitrate-limestone mixtures	131	3,084	297,306	2,628	3,952	48,568	2,017	87	250	0	358,023
Ammonium sulfate	285	5,124	4,670	61,407	5,961	3,616	56,964	70,404	237,764	73,773	519,968
Calcium cyanamide	880	11,230	16,863	2,938	249	15,243	13,552	1,119	6,808	0	68,882
Calcium nitrate	0	32	12,120	60	0	34	96	6,639	36,868	68	55,917
Nitrogen solutions: 20-41% N.	26	3,489	13,701	19,566	37,634	1,501	4,218	6,637	21,994	0	108,766[5]
Sodium nitrate	2,066	14,762	369,010	1,666	170	169,774	56,982	835	436	141	615,842
Urea	311	1,871	4,927	9,376	4,727	1,577	6,340	12,545	18,406	8,505	68,585
Other	40	396	1,702	518	213	7	461	0	0	0	3,337[6]
NATURAL ORGANIC MATERIALS											
Blood, dried	0	159	29	0	2	0	0	11	1,703	0	1,904
Castor pomace	4,606	128	3,326	0	0	0	0	0	1,256	0	9,316
Compost[7]	22	151	57	5,319	525	1	2,948	0	3,072	0	12,095
Cottonseed meal[7]	7,957	50	1,267	0	0	0	4	0	14	0	9,292
Fish scrap, meal, and emulsions	455	4	1	0	0	0	0	24	1,430	0	1,914
Manures, dried	5,332	12,272	2,981	7,473	5,587	816	2,457	10,509	241,028	3	288,458
Sewage sludge, activated	6,388	13,755	4,263	31,120	11,270	1,218	2,881	2,530	15,289	80	88,794
Sewage sludge, other	0	75	0	1,229	562	0	119	0	30,497	0	32,482
Tankage, animal	0	11	0	0	0	0	0	0	378	0	389
Tankage, process	1,854	7,001	2,828	255	0	7	0	1	152	0	12,098
Other[7]	851	1,442	485	0	303	1	0	636	610	30	4,358[8]
PHOSPHATE MATERIALS											
Ammonium phosphate: 11-48	0	0	0	1,184	17,950	0	1,166	2,754	10,915	2,725	36,694
Ammonium phisphate: 16-20[9]	0	0	0	486	71,665	0	57,000	37,745	95,180	247	262,323
Ammonium phosphate: 13-39	0	0	0	1,344	20,431	0	11,688	2,358	1,460	0	37,281
Ammoniated superphosphate[10]	0	0	1	0	0	0	76	0	10,450	318	10,845
Basic lime phosphate	0	0	412	55	0	0	0	0	0	0	467
Basic slag	0	8,577	24,832	0	0	121,763	4,352	0	0	0	159,524
Bonemeal, raw	255	432	605	137	12	11	89	1	733	0	2,275
Bonemeal, steamed	1,478	4,145	870	1,483	33	337	527	6	1,157	0	10,036
Calcium metaphosphate	0	227	2,162	10,214	18,502	11,101	1,123	294	87	0	43,710
Fused tricalcium phosphate	0	0	458	106	0	15,508	83	0	0	0	16,155
Phosphoric acid: 28-54% P_2O_5	0	0	0	0	0	0	284	5,703	8,944	650	15,581[11]
Phosphate rock	619	9,423	19,546	400,726	127,528	6,654	15,267	33	1,836	1,465	583,097
Colloidal phosphate	61	1,114	2,131	6,211	4,325	6,052	370	0	1,292	0	21,556
Precipitated bone	324	0	0	0	0	0	0	0	0	0	324
Superphosphate: 18%	6,338	12,660	36,415	28,766	15,073	18,126	60	210	3,009	1,653	122,310
Superphosphate: 19%	238	1,382	2,620	19	406	205	0	16,249	71,652	0	92,771
Superphosphate: 20-22%	25,728	72,361	44,866	56,774	50,971	82,099	110,766	15,025	7,198	4,853	470,641
Superphosphate: 23-41%	0	4,452	0	3,228	717	21	3,186	2,699	0	0	14,303
Superphosphate: 42-44%	0	0	0	0	17,138	0	0	36,819	10,731	0	64,688
Superphosphate: 45%	9	1,127	145	30,326	76,381	1,805	33,893	12,286	4,026	14	160,012
Superphosphate: 46%	115	55	37	4,777	27,868	5,745	2,094	13,861	11,041	379	65,972
Superphosphate: 47%	0	39	16	4,743	9,012	575	503	2,220	0	0	17,108
Superphosphate: 48%	0	0	279	3,182	3,839	1,191	1,648	94	0	0	10,233
Superphosphate: 49-50%	0	0	61	1,031	3,926	973	3,206	427	0	0	9,624
Other	0	0	0	0	1,305	101	2,442	1,378	440	0	5,666[12]
POTASH MATERIALS											
Cotton hull ashes	687	2	0	0	0	0	0	0	0	0	689
Lime-potash mixtures: 2-6% K_2O[13]	0	178	18,112	0	0	3,000	0	0	3,539	0	24,829
Manure salts: 20-30% K_2O	0	5	1,855	0	0	2	350	0	0	0	2,212
Potassium chloride: 50% K_2O	0	64	15,215	665	3,050	8,239	7,967	548	509	991	37,248
Potassium chloride: 58-62% K_2O	2,028	3,419	31,323	121,552	29,749	45,995	29,446	456	4,532	12,909	281,409
Potassium magnesium sulfate	202	582	2,252	1,903	764	541	331	15	129	5	6,324
Potassium nitrate[10]	101	6	0	0	0	0	0	0	0	0	107
Potassium phosphate ash[10]	0	0	560	0	0	0	0	0	0	0	560
Potassium sodium nitrate[10]	3	0	16,379	18	0	42	15	0	0	0	16,457
Potassium sulfate	166	792	7,066	1,095	1	9,410	38	502	4,724	1,324	25,118
Other	0	8	4,313	1	0	0	0	0	1,378	431	6,131[14]
PRIMARY NUTRIENT FERTILIZERS	439,242	2,124,932	6,007,477	4,514,577	2,183,257	2,934,067	1,366,198	398,116	1,538,185	437,346	21,943,397
SECONDARY & TRACE ELEMENT MATERIALS[7]											
Aluminum sulfate	8	8	0	0	0	3	0	0	87	0	106
Borax	107	253	955	121	38	415	21	1	475	0	2,386
Calcium sulfate (gypsum)	217	3,167	68,553	2,038	995	1,457	297	20,925	643,467	0	741,116
Copper sulfate	0	59	259	41	0	2	0	6	121	0	488
Ferrous sulfate	0	0	21	0	0	0	0	14	1,547	2,283	3,865
Magnesium sulfate	55	43	1,938	9	0	0	0	0	35	0	2,080
Manganese sulfate	0	411	173	262	0	0	0	55	396	28	1,325
Mixed minerals	4	0	13	12	0	0	67	48	3,539	0	3,683
Sulfur: 25-99% S	5	140	1,038	110	9	0	254	6,282	13,066	0	20,904
Sulfuric acid: 40-93%	0	0	0	0	0	0	0	0	2,346	0	2,346
Zinc sulfate	0	12	124	1	0	45	15	42	1,613	73	1,925
Other	0	29	0	55	0	0	0	0	0	0	84[15]
SECONDARY & TRACE ELEMENT MATERIALS	396	4,122	73,074	2,649	1,042	1,922	654	27,373	666,692	2,384	780,308
ALL FERTILIZERS	439,638	2,129,054	6,080,551	4,517,226	2,184,299	2,935,989	1,366,852	425,489	2,204,877	439,730	22,723,705

[1] Includes distribution by Government agencies. Does not include the quantities of materials used for the manufacture of the indicated quantities of commercial mixtures.
[2] Hawaii and Puerto Rico. Data for Alaska not available.
[3] 290,337 tons nitrogen.
[4] 46,617 tons nitrogen.
[5] 38,362 tons nitrogen.
[6] Ammonium sulfate-nitrate 3,019 tons, 16-0-0 material other than sodium nitrate 291 tons, urea flash scrap 27 tons.
[7] Distributed by manufacturers of fertilizers.
[8] Meals: cocoa shell 431, crab 10, hoof and horn 448, linseed 407, soybean 237, tung 118, other seed 432, vegetable 13; peat 116; others classified only by grades 2,096 tons.
[9] Includes quantities reported as 16-20-0 mixtures.
[10] Additional quantities may have been reported as mixtures.
[11] 7,669 tons P_2O_5.
[12] Product classifications withheld to avoid disclosing figures for individual establishments.
[13] Incomplete. Additional quantities are given free to farmers for which no records are kept.
[14] Potassium carbonate 88, potash solution 1,809, tobacco stems 1,362, and wood ashes 2,872 tons.
[15] Magnesium oxide 18, manganese oxide 55, and brucite 11 tons.

creases in 7; and for total primary nutrients, increases in 44 and decreases in 7.

MATERIALS

The consumption of fertilizer materials for direct application amounted to 7,375,855 tons in 1954-55 as compared with 7,232,423 tons in 1953-54. The quantity, in 1954-55, comprised chemical nitrogen materials 3,500,167 tons, phosphate materials (including ammonium phosphates, 11 - 48, 13 - 39, ammonium phosphate-sulfate as well as all mixtures reported as the 16-20-0 grade) 2,233,196 tons, natural organic materials 461,100 tons, potash materials (including potassium nitrate, potassium-sodium nitrate, and lime-potash) 401,084 tons, and secondary and trace element materials 780,308 tons. Compared with 1953-54 there was an increase of 239,764 tons in chemical nitrogen materials, 41,032 tons in natural organic materials, 9,521 tons in potash materials, and 164,795 tons in secondary and trace element materials. Consumption of all phosphate materials was 311,690 tons below that in 1953-54. The consumption of the principal materials comprising these classes is shown by States and regions in Tables 4 and 5.

In chemical nitrogen materials the principal changes from the previous year were increases in consumption of ammonium nitrate (from 924,736 to 1,115,358 tons) and nitrogen solutions including aqua ammonia (from 191,592 to 340,574 tons). In Table 5, the consumption of aqua ammonia is reported separately for the first time. The increasing use of this product on the west coast and in the Territories was the principal reasons for the higher tonnage of all nitrogen solutions reported in 1954-55. Consumption of anhydrous ammonia was 3,207 tons more than that of 350,474 tons in 1953-54. A comparison of the reports of distributors and applicators for both years, showed an average decrease of approximately 4 per cent in the marketing of this product. Sales by new distributors and applicators brought the total to 353,681 tons in 1954-55. Consumption of ammonium nitrate-limestone mixtures, ammonium sulfate, and sodium nitrate were all below that of 1953-54. The use of urea, which is also shown separately for the first time, amounted to 68,585 tons. Consumption of most of the natural organic materials, excepting dried manures and sewage sludge were approximately of the same magnitude as in the previous year. Dried manures increased from 259,868 tons to 288,458 tons and activated sewage sludge from 70,021 tons to 88,794 tons.

Although the tonnages of many of the phosphate materials consumed in 1954-55 were higher than that of the preceding year, the total tonnage for all of these products was below that in 1953-54 due to the relatively large decrease in the use of phosphate rock. The use of phosphate rock was lower in 32 of the 51 political units covered. Total consumption of this product was 583,097 tons compared with 876,375 tons in 1953-54. The consumption of superphosphates grading 22 percent and under was below that in 1953-54 in 30 of the political units. Consumption of these products were only 685,722 tons as compared with 786,927 tons in the preceding year. Consumption of superphosphates grading over 22 percent amounted to 341,940 tons as compared with 247,142 tons in 1953-54. The combined tonnage of all superphosphates in 1954-55 was 1,027,662 tons as compared with 1,034,069 tons in the preceding year but the available P_2O_5 content of these products in 1954-55 was 22,830 tons higher due to the increased use of higher analyses superphosphates.

The 60-percent grade of potassium chloride was greatly favored over the 50-percent grade; the respective consumption of these grades were 281,409 tons and 37,248 tons in 1954-55, as compared with 256,979 and 53,056 tons in 1953-54. Most of the other eight potassium products were consumed in lower amounts than in the preceding year.

The total consumption of calcium sulfate (gypsum) increased to 741,116 tons from 576,780 tons in the preceding year. The consumption in California alone increased from 414,067 to 615,815 tons.

The weighted average primary nutrient content of the principal classes of materials consumed is given in Table 7. These averages are based on the composition and tonnage of the individual materials comprising the several classes. For materials containing only nitrogen, P_2O_5, or K_2O, the respective national averages were 31.00, 19.32 (available P_2O_5), and 54.56 percent, while the multiple-nutrient materials averaged 21.64 percent. The corresponding averages for these classes in 1953-54 were 30.81, 15.70, 54.01, and 17.53 percent. The national averages for all classes were higher than in 1953-54 reflecting the greater use of higher analysis products.

PRIMARY NUTRIENTS

The quantities of primary nutrients in fertilizers are based on the average analyses of samples of the various products as published by fertilizer control officials for the State in which they were consumed, rather than on the manufacturers' guarantees. Thus, the overruns or underruns of nutrients from the guarantees are taken into account. This gives more nearly the actual tonnages of nutrients than would be the case if only the guarantees were used. The actual nutrient content usually averages somewhat higher than the guarantee.

Fertilizers consumed in the United States and Territories in 1954-55 contained 1,960,536 tons of nitrogen, 2,284,362 tons of available P_2O_5 (2,597,549 tons of total P_2O_5), and 1,874,943 tons of K_2O (Table 6). Compared with 1953-54, the quantities of these nutrients increased, for nitrogen, 113,120 tons (6.12 per cent), for available P_2O_5, 49,814 tons (2.23 percent), for K_2O, 61,349 tons (3.38 percent), while total P_2O_5 decreased 41,870 tons (1.59 percent).

The annual consumption of primary nutrients in the United States and Territories for the years 1944-45 through 1954-55 is shown in Figure 1. During the period from 1944-45 to 1949-50 the consumption of nitrogen increased at the rate of approximately 75,000 tons annually, whereas the annual rate of increase in subsequent years through 1953-54 was about 210,000 tons. The increase for the 1954-55 year was only 113,120 tons as compared with the above average since 1949-50. In general, the annual rate of increase of K_2O has about paralleled that of nitrogen from 1944-45 to 1949-50, but there has been a decreasing trend in the annual rate of increase since 1950-51. In both 1953-54 and 1954-55, the consumption of K_2O was lower than that of nitrogen. The increase in consumption of K_2O in 1954-55 over 1953-54 was only 61,349 tons; approximately one-half that of nitrogen. The trend in the annual rate of increase in the consumption of available P_2O_5 follows more closely the trend pattern of the consumption of primary nutrient fertilizers than either that of nitrogen or K_2O during this period. The average percentage content of P_2O_5 in fertilizers has remained about 10 percent while that of nitrogen and K_2O have each increased from approximately five percent to

Table 6—Consumption of Primary Plant Nutrients, Year Ended June 30, 1955[1]

State & Region	In Mixtures					In All Fertilizers				
		P_2O_5					P_2O_5			
	Nitrogen	Available	Total	K_2O	Total N, Avail. P_2O_5, & K_2O	Nitrogen	Available[2]	Total[3]	K_2O	Total N, Avail. P_2O_5, & K_2O
Maine	12,469	19,377	20,770	22,291	54,137	13,055	20,207	21,644	22,344	55,606
New Hampshire	797	1,765	1,824	1,906	4,468	1,191	2,312	2,382	1,974	5,477
Vermont	1,249	4,509	4,653	5,136	10,894	1,519	8,069	8,396	5,351	14,939
Massachusetts	4,316	6,807	7,097	6,677	17,800	5,484	8,146	8,568	7,055	20,685
Rhode Island	837	1,494	1,560	1,676	4,007	985	1,606	1,693	1,730	4,321
Connecticut	3,792	5,415	5,860	6,153	15,360	5,176	7,279	7,859	7,395	19,850
New England	23,460	39,367	41,764	43,839	106,666	27,410	47,619	50,542	45,849	120,878
New York	33,697	62,139	66,276	51,418	147,254	41,366	71,582	76,640	52,262	165,210
New Jersey	13,887	27,247	28,184	26,690	67,824	16,924	28,848	30,088	27,506	73,278
Pennsylvania	31,263	75,650	78,275	68,974	175,887	37,320	84,681	89,302	69,901	191,902
Delaware	4,438	10,040	10,469	10,668	25,146	5,641	10,239	10,689	10,776	26,656
District of Columbia	136	208	223	104	448	177	245	272	109	531
Maryland	13,683	33,349	35,484	29,789	76,821	16,470	34,681	37,377	30,035	81,186
West Virginia	3,017	9,104	9,775	7,309	19,430	3,831	10,056	10,814	7,381	21,268
Middle Atlantic	100,121	217,737	228,686	194,952	512,810	121,729	240,332	255,182	197,970	560,031
Virginia	26,416	77,017	82,248	73,049	176,482	40,203	79,721	85,776	75,499	195,423
North Carolina	58,962	140,584	151,558	136,193	335,739	116,188	145,388	156,922	143,902	405,478
South Carolina	23,829	63,675	68,386	55,388	142,892	68,811	68,522	73,903	69,640	206,973
Georgia	42,074	99,327	106,968	97,077	238,478	90,835	106,118	114,566	103,437	300,390
Florida	64,039	74,686	90,820	91,555	230,280	81,205	77,143	97,497	95,335	253,683
South Atlantic	215,320	455,289	499,980	453,262	1,123,871	397,242	476,872	528,664	487,813	1,361,947
Ohio	45,689	140,341	149,817	136,849	322,879	57,656	146,118	157,837	138,791	342,565
Indiana	46,524	149,187	155,219	152,720	348,431	78,785	158,691	170,156	174,188	411,664
Illinois	29,509	76,980	80,232	81,134	187,623	73,351	117,049	228,112	130,884	321,284
Michigan	27,737	88,056	91,740	85,087	200,880	36,521	91,302	96,016	85,730	213,553
Wisconsin	15,193	60,900	64,021	71,816	147,909	20,505	62,152	67,546	74,390	157,047
East North Central	164,652	515,464	541,029	527,606	1,207,722	266,818	575,312	719,667	603,983	1,446,113
Minnesota	13,355	38,757	62,836	42,392	114,506	34,959	78,244	83,492	43,784	156,987
Iowa	27,818	68,500	71,438	42,540	138,858	69,707	100,003	108,478	49,789	219,499
Missouri	34,630	64,865	68,735	52,674	152,169	69,748	75,083	109,454	62,907	207,738
North Dakota	1,785	6,247	6,558	1,328	9,360	4,598	22,329	23,113	1,359	28,286
South Dakota	1,714	3,388	3,642	235	5,337	5,904	8,557	8,998	246	14,709
Nebraska	5,093	9,939	10,048	1,243	16,275	55,794	26,719	28,189	1,450	83,963
Kansas	9,524	19,299	20,419	3,463	32,286	39,572	44,846	47,476	4,121	88,539
West North Central	93,919	230,997	243,676	143,875	468,791	280,282	355,783	409,200	163,656	799,721
Kentucky	18,230	47,174	51,664	46,783	112,187	28,575	60,811	68,218	57,009	146,395
Tennessee	19,237	46,198	49,901	43,048	108,483	41,282	55,229	59,928	52,380	148,891
Alabama	34,743	88,216	95,176	65,768	188,727	85,812	97,604	106,023	71,022	254,438
Mississippi	18,632	30,960	33,375	24,976	74,568	115,293	44,067	48,996	37,308	196,668
East South Central	90,842	212,548	230,116	180,575	483,965	270,962	257,711	283,165	217,719	746,392
Arkansas	9,134	18,729	19,882	19,126	46,989	52,692	25,358	26,755	36,642	114,692
Louisiana	10,870	20,061	21,343	16,375	47,306	53,501	25,625	27,733	19,606	98,732
Oklahoma	4,765	10,452	10,947	4,437	19,654	11,044	20,850	23,203	5,093	36,987
Texas	21,108	41,969	44,142	21,485	84,562	75,333	81,601	87,150	22,222	179,156
West South Central	45,877	91,211	96,314	61,423	198,511	192,570	153,434	164,841	83,563	429,567
Montana	285	637	678	37	959	2,201	7,275	7,439	52	9,528
Idaho	638	862	1,082	111	1,611	19,129	12,072	13,313	182	31,383
Wyoming	277	472	497	50	799	997	3,405	3,482	72	4,474
Colorado	1,415	2,471	2,599	680	4,566	7,468	11,144	11,410	879	19,511
New Mexico	229	314	335	50	593	6,146	7,422	7,636	94	13,662
Arizona	2,723	3,354	3,531	580	6,657	34,498	13,738	14,031	1,191	49,427
Utah	419	524	571	113	1,056	4,899	4,457	4,685	159	9,515
Nevada	57	94	98	21	172	175	328	344	23	526
Mountain	6,043	8,728	9,391	1,642	16,413	75,513	59,841	62,340	2,672	138,026
Washington	2,869	4,648	4,834	3,348	10,865	44,135	14,037	14,594	5,033	63,205
Oregon	1,907	3,376	3,604	2,004	7,289	32,056	13,178	13,676	3,108	48,342
California	25,933	24,712	25,594	13,589	64,234	188,630	69,967	73,101	22,651	281,248
Pacific	30,711	32,736	34,032	18,941	82,388	264,821	97,182	101,361	30,792	392,795
Continental U. S.	770,945	1,804,077	1,924,988	1,626,115	4,201,137	1,897,347	2,264,106	2,574,962	1,834,017	5,995,470
Hawaii	6,543	5,711	5,917	9,506	21,760	22,167	8,828	9,540	18,615	49,610
Puerto Rico	26,053	11,299	12,917	22,243	59,595	41,022	11,428	13,047	22,311	74,761
Alaska[4]	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Territories	32,596	17,010	18,834	31,749	81,355	63,189	20,256	22,587	40,926	124,371
Total: 1954-55	803,541	1,821,087	1,943,822	1,657,864	4,282,492	1,960,536	2,284,362	2,597,549	1,874,943	6,119,841
1953-54[5]	778,099	1,793,871	1,922,708	1,603,584	4,175,554	1,847,416	2,234,548	2,639,419	1,813,594	5,895,558
1952-53	728,095	1,782,286	1,920,472	1,552,041	4,062,422	1,637,056	2,270,750	2,765,288	1,738,250	5,646,056

[1] Includes Government distribution.
[2] Includes, as available P_2O_5, 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application.
[3] Includes, as total P_2O_5, 22 percent of the colloidal phosphate and 32 percent of the phosphate rock marketed for direct application.
[4] Not available. In 1952-53, total primary plant nutrients in all fertilizers amounted to 273 tons.
[5] Revised: 7,552 tons of the K_2O mixtures in Florida was originally reported as available and total P_2O_5.

Table 7—Weighted Average Primary Plant Nutrient Content of Fertilizers, in Percent, Year Ended June 30, 1955[1]

State & Region	Mixtures[2]				Primary Nutrient Materials					Average Nutrient Content of Mixtures and Materials
					Single Nutrient[3]					
	N	Available P_2O_5	K_2O	Average Nutrient Content	N	Available P_2O_5[4]	K_2O	Multiple Nutrient[3]	Average Nutrient Content	
Maine	7.12	11.07	12.74	30.93	29.86	19.63	45.10	11.21	20.23	30.51
New Hampshire	5.76	12.75	13.77	32.28	29.48	20.38	54.80	10.76	22.02	29.75
Vermont	4.07	14.70	16.74	35.51	31.30	21.82	57.61	11.47	22.76	30.84
Massachusetts	6.34	10.01	9.82	26.17	20.40	18.98	58.96	11.12	16.76	24.27
Rhode Island	5.73	10.23	11.48	27.44	18.50	17.23	58.57	10.67	16.11	26.11
Connecticut	6.03	8.61	9.78	24.42	22.44	21.55	56.14	12.59	17.67	22.47
New England	6.43	10.78	12.01	29.22	24.25	20.96	56.76	11.96	19.16	27.52
New York	6.19	11.42	9.45	27.06	25.55	20.25	53.64	10.45	21.05	26.25
New Jersey	5.33	10.45	10.24	26.02	24.16	18.87	58.47	11.23	21.50	25.62
Pennsylvania	4.96	12.01	10.95	27.92	27.25	17.07	50.18	10.99	19.54	26.95
Delaware	4.91	11.10	11.80	27.81	33.23	24.15	61.18	8.29	22.75	27.91
District of Columbia	6.54	9.96	5.02	21.52	13.63	10.65	50.40	10.81	11.18	18.80
Maryland	4.59	11.19	10.00	25.78	27.80	16.40	39.13	13.51	22.55	25.58
West Virginia	4.11	12.40	9.95	26.46	25.12	20.70	60.23	9.19	22.18	26.02
Middle Atlantic	5.27	11.47	10.27	27.01	26.40	18.56	52.42	10.50	20.89	26.36
Virginia	3.78	11.03	10.46	25.27	21.05	18.92	13.45	17.04	19.31	24.55
North Carolina	3.98	9.48	9.19	22.65	20.98	17.59	44.33	13.31	21.90	22.51
South Carolina	3.69	9.87	8.59	22.15	20.12	15.36	54.80	27.27	22.79	22.35
Georgia	4.22	9.96	9.74	23.92	23.13	17.56	54.24	21.58	23.63	23.86
Florida	5.79	6.75	8.28	20.82	23.02	8.33	50.08	16.60	19.57	20.70
South Atlantic	4.37	9.24	9.20	22.81	21.46	15.44	42.35	17.95	22.06	22.67
Ohio	4.51	13.85	13.51	31.87	35.02	20.26	54.78	11.55	27.49	31.58
Indiana	4.70	15.06	15.42	35.18	39.64	21.22	61.44	22.91	32.13	35.73
Illinois	5.51	14.38	15.15	35.04	35.90	8.55	61.29	11.35	19.83	26.55
Michigan	4.74	15.05	14.54	34.33	33.61	19.11	48.30	9.79	23.94	33.46
Wisconsin	3.83	15.33	18.08	37.24	46.51	9.30	57.71	10.11	28.04	36.54
East North Central	4.68	14.64	14.98	34.30	37.13	10.32	60.91	12.09	24.01	32.03
Minnesota	4.80	21.10	15.22	41.12	55.03	39.22	59.53	34.49	45.21	42.16
Iowa	7.56	18.60	11.55	37.71	44.26	27.80	57.57	37.33	37.20	37.52
Missouri	7.60	14.24	11.56	33.40	41.85	7.92	58.46	19.51	24.46	30.42
North Dakota	7.54	26.37	5.61	39.52	40.62	45.35	60.37	51.80	48.26	44.96
South Dakota	10.62	20.99	1.46	33.07	45.57	44.36	60.37	38.22	43.06	38.81
Nebraska	10.61	20.71	2.59	33.91	44.85	38.70	60.37	33.92	42.35	40.40
Kansas	10.02	20.45	3.67	34.21	40.81	38.00	60.50	40.69	40.16	37.77
West North Central	7.31	17.98	11.20	36.49	44.44	25.86	58.28	39.97	36.82	36.63
Kentucky	4.39	11.37	11.28	27.04	32.99	23.59	55.61	21.12	31.76	28.01
Tennessee	4.70	11.28	10.51	26.49	32.22	26.14	50.82	12.05	33.11	28.00
Alabama	4.03	10.23	7.62	21.88	23.94	12.71	59.68	12.35	22.19	21.96
Mississippi	5.72	9.50	7.66	22.88	36.20	12.30	56.84	12.23	30.89	27.27
East South Central	4.51	10.56	8.97	24.04	31.05	16.54	55.23	14.29	28.49	25.44
Arkansas	5.84	11.98	12.24	30.06	34.36	34.08	57.64	36.72	38.36	34.46
Louisiana	6.31	11.65	9.51	27.47	37.53	18.02	57.62	32.68	34.64	30.80
Oklahoma	6.88	15.10	6.41	28.39	39.11	22.86	59.50	39.70	30.04	29.14
Texas	6.80	13.51	6.92	27.23	40.75	26.23	58.00	35.58	34.35	30.58
West South Central	6.48	12.88	8.67	28.03	37.47	25.17	57.70	36.00	35.11	31.44
Montana	9.47	21.18	1.23	31.88	32.98	44.57	60.40	46.41	42.31	40.96
Idaho	11.77	15.90	2.05	29.72	29.80	31.12	61.21	37.21	30.81	30.75
Wyoming	13.81	23.53	2.49	39.83	39.26	45.40	60.40	40.61	43.97	43.17
Colorado	10.52	18.37	5.05	33.94	40.36	44.14	53.43	47.00	43.07	40.52
New Mexico	10.75	14.74	2.35	27.84	39.38	36.80	48.69	34.24	42.91	41.93
Arizona	13.00	16.01	2.77	31.78	33.51	35.93	51.83	28.74	32.57	32.46
Utah	11.50	14.38	3.10	28.98	33.70	37.54	60.40	32.58	35.29	34.46
Nevada	8.31	13.70	3.06	25.07	23.38	39.41	57.27	29.18	31.66	29.16
Mountain	11.78	17.01	3.20	31.99	34.12	37.70	53.52	32.69	35.06	34.67
Washington	8.18	13.25	9.54	30.97	35.12	32.39	42.09	34.49	34.89	34.15
Oregon	8.56	15.14	8.99	32.69	30.31	24.87	21.55	37.92	30.94	31.19
California	10.79	10.28	5.66	26.73	29.53	26.11	55.17	12.16	22.66	23.47
Pacific	10.32	11.00	6.36	27.68	30.52	26.95	40.17	14.72	25.02	25.54
Continental U. S.	5.12	11.97	10.79	27.88	31.29	19.31	54.38	21.51	27.87	27.89
Hawaii	10.62	9.27	15.43	35.32	23.39	20.12	58.62	56.20	30.09	32.18
Puerto Rico	11.95	5.18	10.20	27.33	23.24	21.46	56.57	22.00	23.28	26.40
Alaska[5]	----	----	----	----	----	----	----	----	----	----
Territories	11.66	6.08	11.35	29.09	23.31	20.17	58.60	53.05	27.28	28.44
U. S. Average:										
1954-55	5.24	11.86	10.80	27.90	31.00	19.32	54.56	21.64	27.86	27.89
1953-54	5.01	11.54[6]	10.32[6]	26.87	30.81	15.70	54.01	17.53	25.99	26.61
1952-53	4.63	11.34	9.87	25.84	28.54	14.48	51.89	21.96	23.24	25.05

1 Excludes materials not guaranteed to contain one or more of the primary plant nutrients, N, P_2O_5, or K_2O.

2 Guaranteed to contain two or more of the primary plant nutrients.

3 Guaranteed to contain one of the primary plant nutrients.

4 Includes the available P_2O_5 content of colloidal phosphate and phosphate rock as 2 percent and 3 percent, respectively.

5 Not available.

6 Revised.

nearly nine percent during this period.

Mixed fertilizers accounted for 40.99, 79.72, 74.83, and 88.42 percent, respectively, of the nitrogen, available P_2O_5, total P_2O_5, and K_2O consumed in 1954-55. The quantities of these nutrients consumed as mixed fertilizers were respectively, 3.27, 1.52, 1.10, and 3.38 percent greater than in 1953-54.

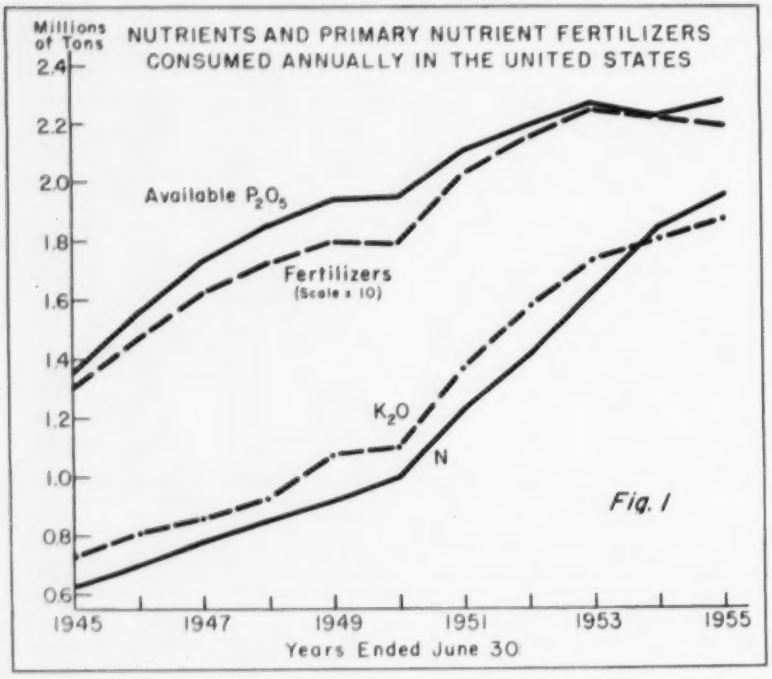


Table 6a—Percent of Increase or Decrease in Consumption of Primary Nutrients in 1954-55 from 1953-54[1]

Region	N		Available P_2O_5		K_2O	
	Mixtures	Materials	Mixtures	Materials	Mixtures	Materials
New England	9.57	2.97	8.88	29.02	6.98	0.90
Middle Atlantic	9.47	14.69	3.80	—6.86	8.04	2.71
South Atlantic	1.31	7.21	1.71	3.47	3.54	5.09
East N. Central	5.58	—2.34	5.01	6.56	1.72	2.08
West N. Central	0.49	8.57	—3.27	25.31	4.92	14.04
East S. Central	0.88	4.76	—0.30	—23.87	1.84	1.60
West S. Central	5.44	6.09	6.46	5.12	0.63	—7.76
Mountain	2.48	17.52	—12.17	3.83	4.45	78.82
Pacific	10.02	13.13	11.49	3.30	7.68	13.44
Continental U.S.	3.48	7.80	1.52	5.17	3.41	3.07
Territories	1.48	25.17	0.72	—0.58	2.18	10.66
United States	3.27	8.20	1.52	5.13	3.38	3.37

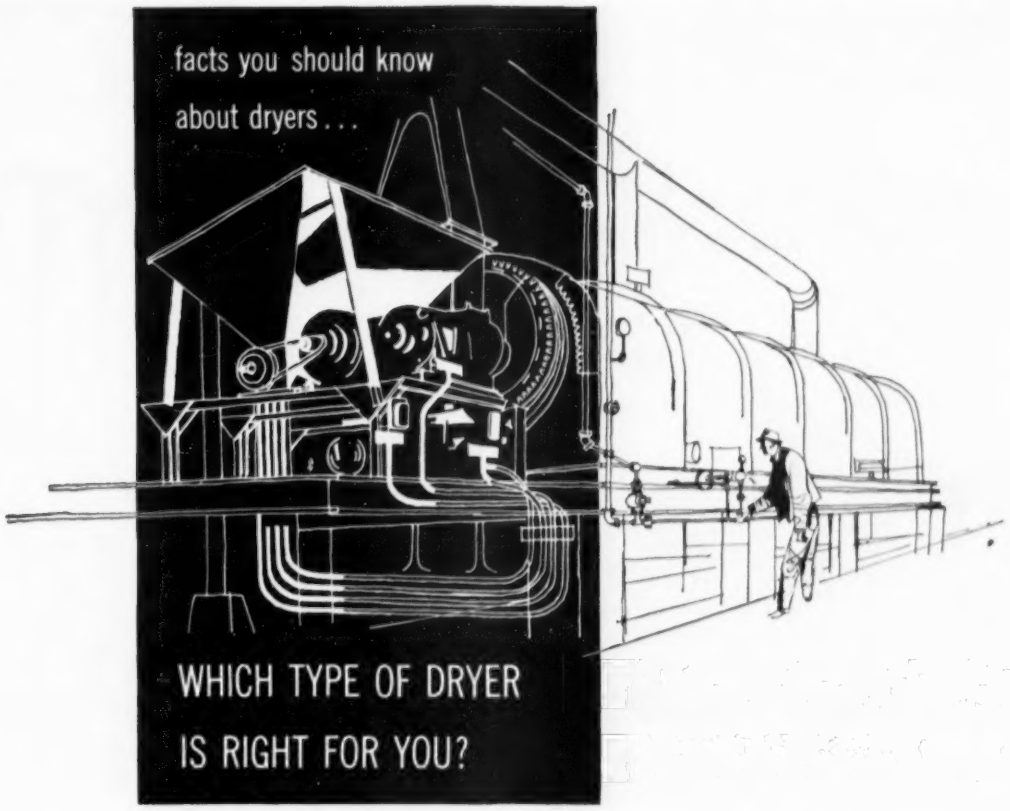
[1] Percentages without signs are increases.

Fertilizer materials for direct application accounted for 59.01, 20.28, 25.17, and 11.58 percent, respectively, of the nitrogen, available P_2O_5, total P_2O_5, and K_2O consumed in 1954-55. The quantities of nitrogen, available P_2O_5, and K_2O consumed as fertilizer materials were, respectively, 8.20, 5.13, and 3.37 percent greater, while the quantity of total P_2O_5 was 9.63 percent smaller than in 1953-54. The percentage change in the quantity of primary nutrients of fertilizer mixtures and materials consumed in 1954-55 as compared with 1953-54 is shown by regions in Table 6a.

The total primary nutrient content of mixed fertilizers consumed in 1954-55 amounted to 4,282,492 tons, or 2.56 percent more than the consumption (4,175,554 tons) in 1953-54. The total primary nutrient content of fertilizer materials in 1954-55 was 1,837,349 tons, or 6.82 percent more than the 1,720,004 tons consumed in 1953-54.

The consumption of all fertilizers (mixtures and materials) bearing primary nutrients was 214,589 tons (0.97 percent) below the 1953-54 level, whereas the total quantity of primary nutrients (nitrogen, available P_2O_5, K_2O) supplied by these fertilizers was 224,283 tons (3.80 percent) above this level.

Although primary nutrient materials consumed for direct application comprised only 30 percent of the tonnage of all fertilizers containing these nutrients, they supplied 59 percent of the nitrogen consumed in 1954-55. Of the various nitrogen bearing products listed in Tables 4 and 5 anhydrous ammonia, aqua ammonia and all nitrogen solutions have contributed increasing portions of direct application nitrogen over the past 10 years. In Figure 2, there is shown, by States, the nitrogen as anhydrous ammonia and nitrogen solutions (of which aqua amonia is a part) as percent of total nitrogen marketed for direct application in 1954-55. There are wide variations in these percentages of nitrogen supplied by liquid nitrogen products. These range from none in most of the States in New England to 74.9 percent in Minnesota, the highest. The average for the United States and Territories is 25.1 percent supplied by anhydrous ammonia nitrogen and 7.3 percent by all other forms of liquid nitrogen.



For over 55 years, Louisville Dryers have been solving industry's drying problems and effecting marked economies. The following is intended as an introduction to selecting the right type of dryer.

Q. *What types of dryers are there?*

A. Many types. They can be classified in two basic categories, namely, batch type and continuous.

Q. *What is proper application of the continuous type?*

A. Where large enough capacity is required to make savings in labor, space, and fuel advantageous.

Q. *What are some other advantages of the continuous type?*

A. Uniform quality of dried product. Lower drying cost.

Q. *What types of continuous dryers are most used?*

A. Rotary, Conveyor, Flash, Spray, Atmospheric Drum.*

Q. *Do all of the above types handle the same kind of material?*

A. No. While they discharge a dried solid, Spray and Drum Dryers are fed with a liquid. (Liquids and thin slurries can be handled in the other types by means of special designs or auxiliary equipment, but seldom are).

Q. *How can I be sure of getting the right type of dryer for my operation?*

A. Louisville engineers start by surveying your needs. Then, after considering the pertinent factors, they make recommendations for dryer type, heating medium, etc. Their recommendations can be proved by practical drying tests in General American's pilot plant. Your Louisville Dryer is then designed and built to suit your particular purpose and to fit your individual needs.

Q. *How can I investigate the matter in greater detail?*

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*Discussions to follow will deal with the subject in more detail.

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This report discusses the effect of fertilizer education and services in Iowa. Educational sales programs similar to the one discussed in the report are being carried out in 35 states. These programs seek to introduce new and improved fertilizers more widely in order to create a more active farmer demand for all plant nutrients. They promote the more advanced methods and practices of applying fertilizer and seek to lower the cost of plant nutrients to the farmer. The interrelationship of the Tennessee Valley Authority and the extension services of the land-grant colleges is explained in the article. Another TVA fertilizer program—the test-demonstration program now 21 year old—is active in 22 states in cooperation with state and federal extension services on individual farms on a whole-farm planning basis. Experimental fertilizers are tested under practical farm conditions under guidance of extension personnel. Agricultural experiment stations are conducting research with TVA fertilizers in Colorado, Iowa, Indiana, Nebraska, New York, Michigan and Washington, as well as in the seven Tennessee Valley states of Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee and Virginia.—Editor.

DO FERTILIZER EDUCATION AND SERVICES PAY?

prepared by
JOHN R. DOUGLAS, JR.
Fertilizer Distribution Analyst
Division of Agricultural Relations
Tennessee Valley Authority
Knoxville, Tennessee

Basic data of the Iowa Fertilizer Retail Dealer Survey were collected and tabulated by the Iowa State College of Agriculture and Mechanic Arts under contract with TVA.

This publication is for the purpose of presenting an idea—what an educational program can mean to a fertilizer dealer's business. The information was obtained from a recent survey of 286 fertilizer dealers in Iowa. They sold almost 40 per cent of the approximately 430,000 tons of fertilizers sold in Iowa during the spring of 1953. Of this group, 154 dealers actually took part in a special educational, demonstrational sales program. These cooperating dealers sold about one-fourth of the fertilizer to almost one-fourth of the fertilizer users in the state.

The ideas presented in this article are an attempt to present one small phase of the findings of this survey. We have tried to show what usually happens to the business of a fertilizer dealer when he undertakes a positive educational program. This paper's contents simply present the results obtained by dealers who carried out an active educational program. The results suggest that other fertilizer dealers might wish to consider developing an educational program and providing more concentrated fertilizers and extra services for the farmers of their community.

Fertilizer Dealer Services Like Supermarket Services

Fertilizer retailers and their distributors who work together to offer their farmer-customers 'extra' services usually find that they sell more fertilizer than do other retailers and distributors. These services are in about the same class as the 'kitchen maid' services that the supermarkets offer housewives.

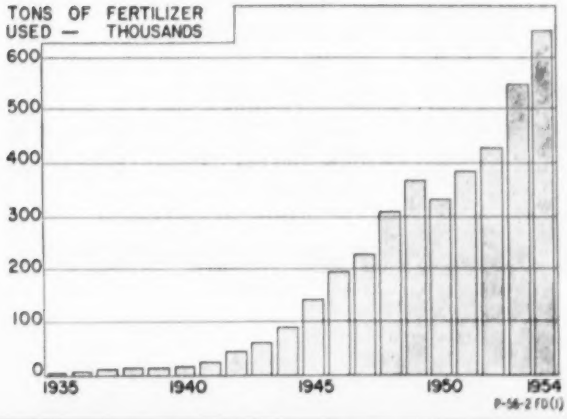
However, some of these services are similar to but different than those offered the housewives. Just as a housewife can now buy well-trimmed meat that is minus much inedible suet and bone, so can farmers now buy fertilizers that are minus much of the 'filler' that farmers formerly had to pay for. And just as the housewives benefit by being able to buy the most nutrition per man-hour of earnings in history, so do farmers benefit by being able to buy lower cost plant-growing nutrients.

Dealer Educational Programs Promote Fertilizer Sales

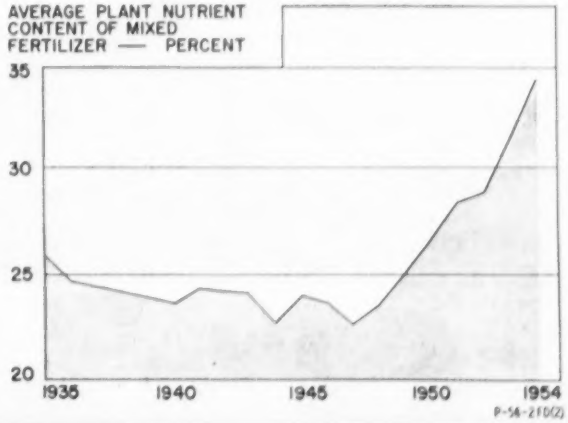
All this was borne out in a survey of 286 fertilizer dealers in Iowa. These dealers handled nearly 40 per cent of the approximately 430,000 tons of fertilizers sold in Iowa during the spring season of 1953. Of this group, 154 dealers actually took part in a special educational program that was aimed at teaching farmers how to use fertilizers more effectively, how to save money by buying the more concentrated fertilizers; and how to use fertilizer on crops not generally fertilized before. Both gross sales of fertilizers and percentage of income for these 154 dealers was usually larger than it was for the 132 dealers who did not take part in that educational program.

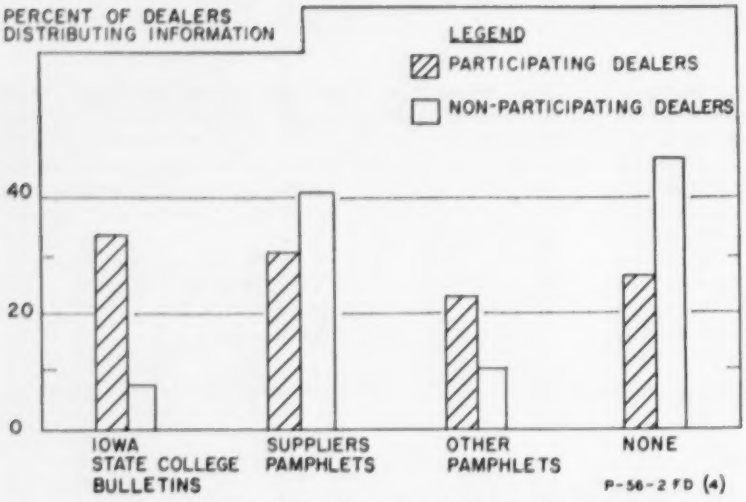
These 154 dealers who took part in the special educational program sold on an average almost twice as

Iowa farmers are using more fertilizer.

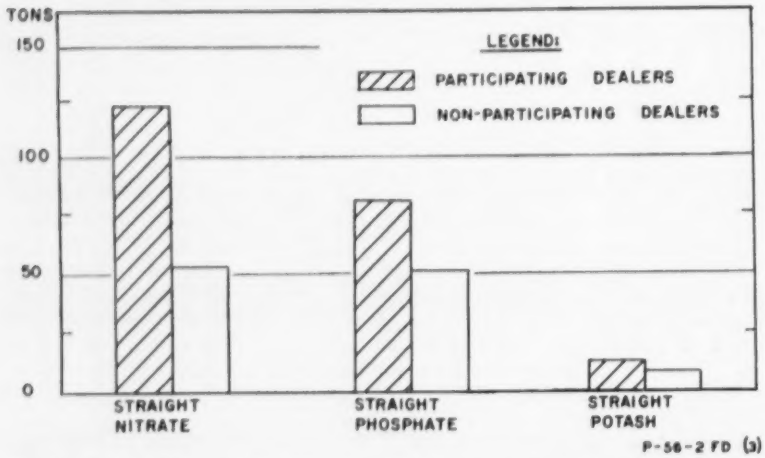


Each ton contains more plant nutrients.





More dealers who took part in the educational program gave out printed information on fertilizer use.



Dealers who took part in the educational program sold more fertilizers

many tons of straight fertilizer materials as did the other dealers. They sold over one-third more tons of mixed fertilizers than other dealers in the survey.

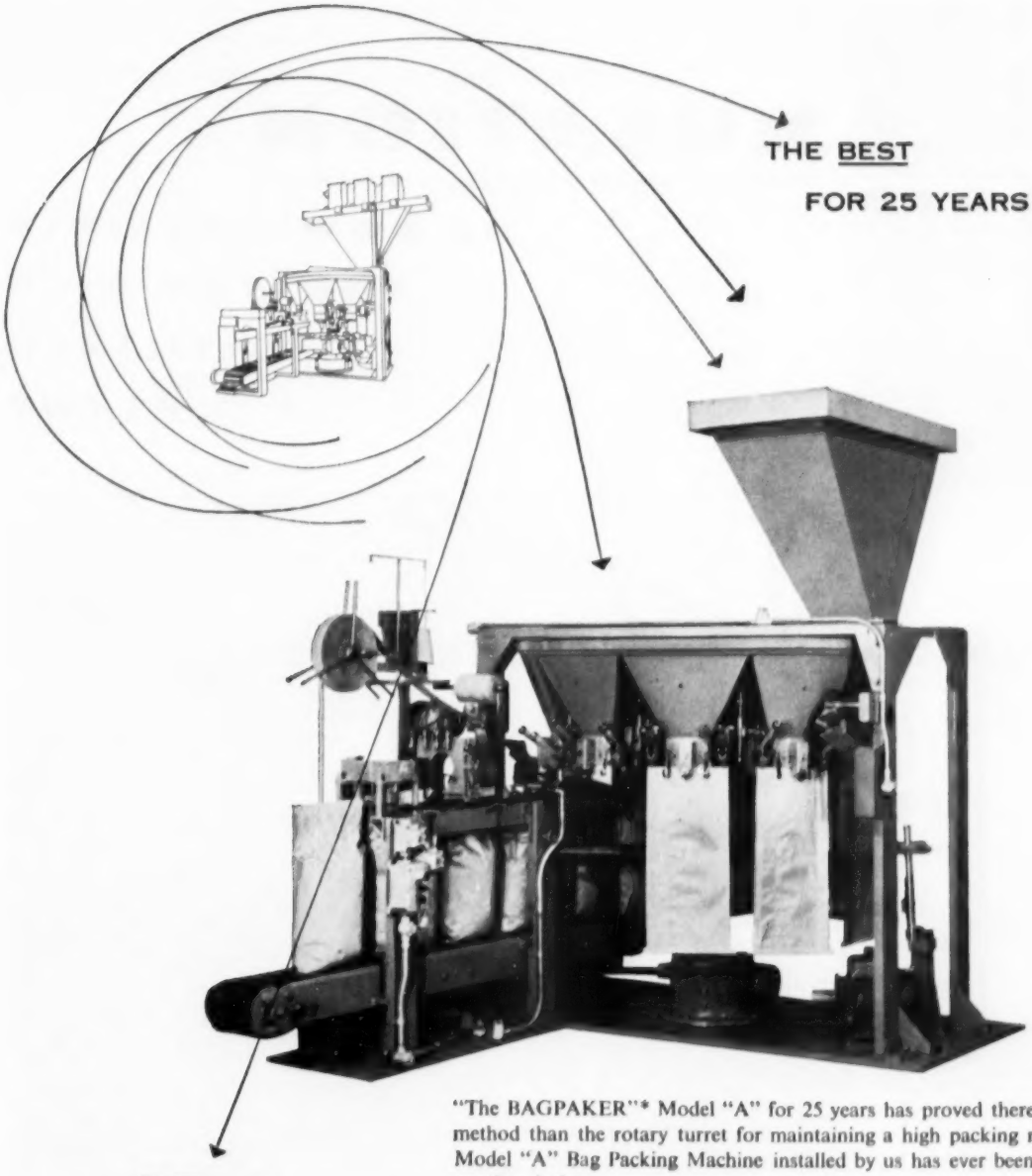
These dealers who took part in the special educational program sold more high analysis grades than other dealers. More grades sold by participating dealers contained 40 or more units—40 or more percent—of plant nutrients. On the other hand, fewer grades sold by dealers taking part in the program contained less than 30 units of plant nutrients. Eighty-seven percent of the dealers who took part in the program had a "best seller" in mixed fertilizers that contained 30 or more units of plant nutrients. Only 60 percent of the non-participating dealers had a "best seller" mixed fertilizer that was that concentrated.

Educational Programs Help Farmers Save Fertilizer Dollars

Usually farmers can save on their fertilizer bill by buying more concentrated fertilizers. When this survey was taken, Iowa farmers could save about $13.69 per ton by buying straight concentrated fertilizers instead of 3-12-12 mixed fertilizer. This was possible if farmers were to buy 33 percent ammonium nitrate, 48 percent concentrated superphosphate, and 60 percent potash —rather fertilizer in the form of 3-12-12.

Dealers who took part in the educational program sold more of these economical straight materials than did the non-participating dealers. This is shown in the bar chart. The use of these economical straight materials to supply farmers' needs for fertilizer was particularly helpful when bulk-spreading service was also available.

If, for the sake of convenience, the farmer preferred mixed fertilizers, he could still save money, time, and labor by buying high analysis mixtures such as 5-20-20 instead of the lower analysis 3-12-12. In 1953, Iowa farmers who bought 5-20-20 fertilizer saved over $140,000 cash by buying it rather than the lower analysis 3-12-12. In addition, they hauled, handled, and spread only three-fifths as many bags. These savings in high analysis mixtures must have impressed Iowa farmers: In 1953—the year the survey was made, they bought over three times as many tons of 3-12-12 as 5-20-20; a short two years later, 1955, they bought over five times as much 5-20-20 as they did 3-12-12.



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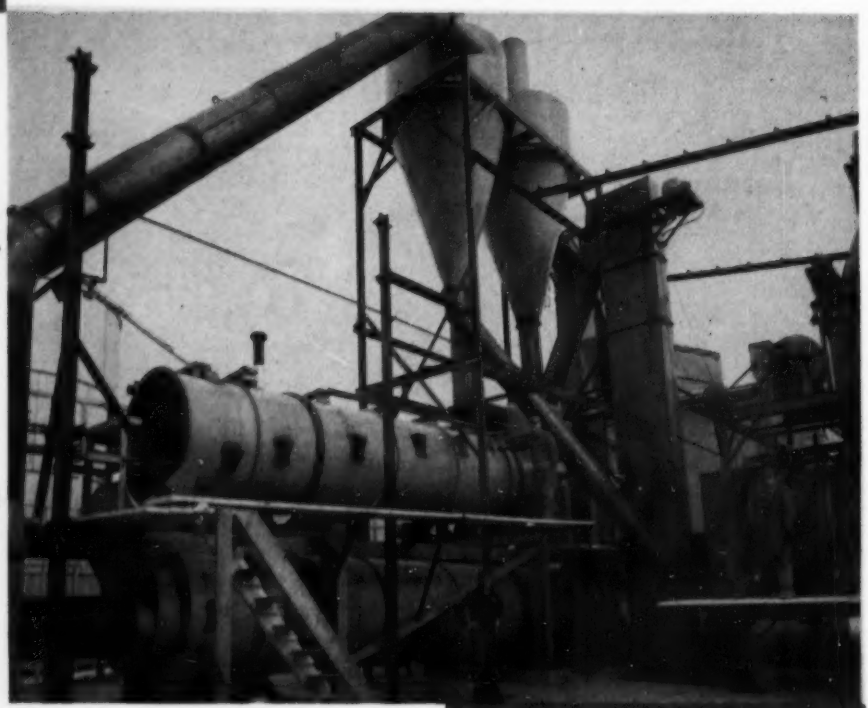

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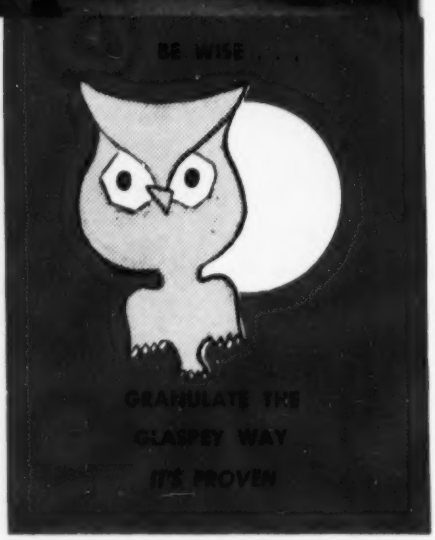

DEALERS SERVICES HELP EDUCATE FARMERS

Farmers Appreciate Testing, Spreading Services

The Iowa fertilizer dealers who had the greatest sales volume helped their farmer-customers in many ways. One form of help was in testing soils for farmers to determine their plant nutrient requirements. Some dealers sent soil samples to the agricultural college soil testing laboratory. Some merely explained the procedure to farmers and supplied bags for mailing in the soil samples.

Another form of help to the farmers was dealer rental of fertilizer spreaders. Yet another service was that of 'bulk spreading' fertilizer. This was done by the local fertilizer dealer or a custom operator who spreads bulk—or unbagged—fertilizer by the truck load over a large field in a short time. As a rule, the per unit cost of plant nutrients to farmers for fertilizer that is bulk spread on the land is less than the cost of the same materials in bags at the dealer's warehouse. Another dealer service was delivery of bagged fertilizer to the farm.

DEALERS BRING AG' COLLEGE TO FARMERS

Literature Plus Meetings Equals Fertilizer Schools

Another dealer service popular with fertilizer customers was that of supplying them with state agricultural college publications. Fertilizer dealers who did this consistently sold more fertilizer than those who didn't. Most fertilizer dealers in the study furnished some printed information to farmers who bought fertilizer from them. Some of this literature was in the form of pamphlets sent out by the wholesale fertilizer distributors. Dealers who distributed the most fertilizer also distributed the most college bulletins.

Cooperation between the state agricultural college and the more successful fertilizer dealers in the state extended beyond the use of publications on the use of fertilizer. The retail dealers, with the help of county extension directors, held meetings for dealers and key farmers who were especially interested in learning how to use fertilizer more effectively. Wholesale fertilizer dealers invited extension personnel to tell retailers and specially selected farmers about more efficient fertilizer use. Some dealers sponsored field plot demonstrations which were established and supervised by the local county agent.

MEANING BEHIND THE COOPERATIVE EDUCATIONAL SALES PROGRAM

Educational Services and Information Aimed at Efficient Farming

Slightly more than half—or 154—of the dealers surveyed took part in the cooperative educational sales program utilizing some TVA fertilizers. In this educational-demonstrational program, the state college, county extension directors, regional, wholesale and retail distributors and TVA are geared together in presenting farmers with the best information about fertilizer usage. The program is meshed to help them obtain and apply new, high-analysis fertilizers, to reduce their fertilizer distribution costs; to lower the initial per unit cost of plant nutrients by selling the farmers the more concentrated fertilizers; and to help farmers determine their plant nutrient requirements. In short, the educational sales program is aimed at the most important fertilization

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practices affecting farmers today. The survey showed that the dealers who took part in this program sold more fertilizer—on the average—than those dealers who did not.

Program Also Aids Fertilizer Dealers

What does this mean? It means that the educational sales program probably helps fertilizer dealers to become more aware of the 'extra' services that farmers need and like. To repeat, here are a few of them: helping with soil tests for lime and fertilizer; furnishing college publications about fertilizer and its use; holding fertilizer meetings at which dealers and key farmers in different communities attended; enabling farmers to rent special equipment for spreading one-element, high analysis fertilizers; furnishing drivers and dealer-owned trucks to custom spread the farmers' fertilizer — straight or mixed; using extension service recommendations in educational-type advertisements on radio and in newspapers, magazines, and pamphlets. Dealers, distributors, and manufacturers of fertilizers found that extra services helped sell their products. And they handled products which were higher in plant nutrients than the average, which saved unnecessary handling of extra pounds of material. Higher analysis fertilizers usually cost farmers less per unit of plant nutrient. Savings in transportation, handling and storage are big factors in the total savings. Hence, dealers' sales programs became more effective.

In addition, dealers who were active in the educational sales program promoted improved fertilization practices. These improved fertilization practices were for crops not ordinarily fertilized, or for fall-season fertilization of crops, or for achieving special results from new fertilizers of higher analysis than farmers were using. Convincing a farmer that he ought to apply more plant nutrients than he has been using—while backing up the sales talk with bona fide state college information—will usually stimulate fertilizer sales and result in more efficient crop production.

IOWA'S IMPROVED FERTILIZATION PRACTICES—1953

Here's how the TVA-produced materials were used in the improved fertilization practices phase of the educational sales program in 1953.

1. TVA ammonium nitrate was to

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be used: A. for grass seed production. B. as wheat top-dressing—to increase yield and protein content. C. on oats—provided adequate phosphate and potash are added. D. in top-dressing permanent grass and supplementary pasture. E. in special fertilizer demonstrations on corn as outlined by the Iowa Committee on TVA Fertilizer Use.

2. TVA concentrated superphosphate and calcium metaphosphate (including mixtures containing these materials) were to be used: A. on legumes at seeding time. B. in top-dressing legumes. C. in pasture renovation. D. on corn (on soils testing very low in available phosphorus).

The major uses outlined above were designed by representatives of Iowa State College and the dealers concerned as a program to help in the education of Iowa farmers on proper fertilizer use. At the same time they helped fulfill the primary purposes of TVA's fertility educational program. These three purposes are: to introduce higher analysis fertilizer to farmers where they are more economical; to lower the cost of plant nutrients to farmers; and to encourage the efficient use of fertilizer by farmers.

Farmer Education and Service Bring New Customers

This report on the survey bears out what has been sensed for some time by progressive people in the fertilizer industry: Educate a farmer on how to use a concentrated, up-to-date fertilizer. Sell him such a fertilizer—one that contains more plant nutrients per bag and per dollar invested. Provide him with extra physical services, such as soil testing and bulk spreading. Farmers will patronize dealers who provide all of this for them and build their businesses into large volume sales—just as housewives patronize the supermarkets and make them large-volume merchandisers of high-quality, low-cost foods.

The fact that those dealers who took part in the educational sales program sold the most fertilizer does not mean that a dealer has to take part in that program in order to be a successful, large-volume fertilizer dealer. But it does suggest that other dealers might want to consider developing an educational program; thus they would provide extra services and dollar-wise buys in fertilizer and allied services in an effort to achieve similar results in their community. At the same time the dealer is doing this, he will be contributing toward low-cost farm crop production in that farming community.

NEW BORAX ORGANIZATION ANNOUNCED

J. M. Gerstley, president of United States Borax & Chemical Corporation, has announced that, at a board of directors meeting held in New York July 10th, certain decisions were reached with respect to the organization of the new company which resulted from the merger of the former United States Potash Company into the former Pacific Coast Borax Company.

The administrative office of the new corporation will be located in Los Angeles in the Company's own office building, 630 Shatto Place. P. J. O'Brien will be the vice president and general manager of the new Company with Los Angeles as his headquarters.

The following four operating divisions have been created: The Pacific Coast Borax Company Division, which will carry on borax manufacturing and sales in the industrial field under the leadership of J. F. Corkill, who has been appointed vice president and general manager of this division; The United States Potash Company Division which will be responsible for the production and sale of potash under Dean R. Gidney, who has been appointed vice president and general manager of that division, the research activities of the new Company have also been organized under a separate division of which G. A. Connell will be vice president and Dr. D. S. Taylor, director.

For the time being, the head office of the Pacific Coast Borax Company Division will remain at 100 Park Avenue, New York and that of the United States Potash Company Division at 30 Rockefeller Plaza, New York. It is planned to locate these divisions together in new premises in New York when suitable arrangements can be effected. The principal office of the Research Division will be located in Los Angeles for the present.

At the board meeting of July 10th, the directors authorized the construction of a research center for the Company on a five-acre tract of land recently acquired in the vicinity of Anaheim, California. This is expected to cost, fully equipped, approximately one million dollars and to be ready for occupancy around March, 1957. Thereafter the principal activities of the research divi-

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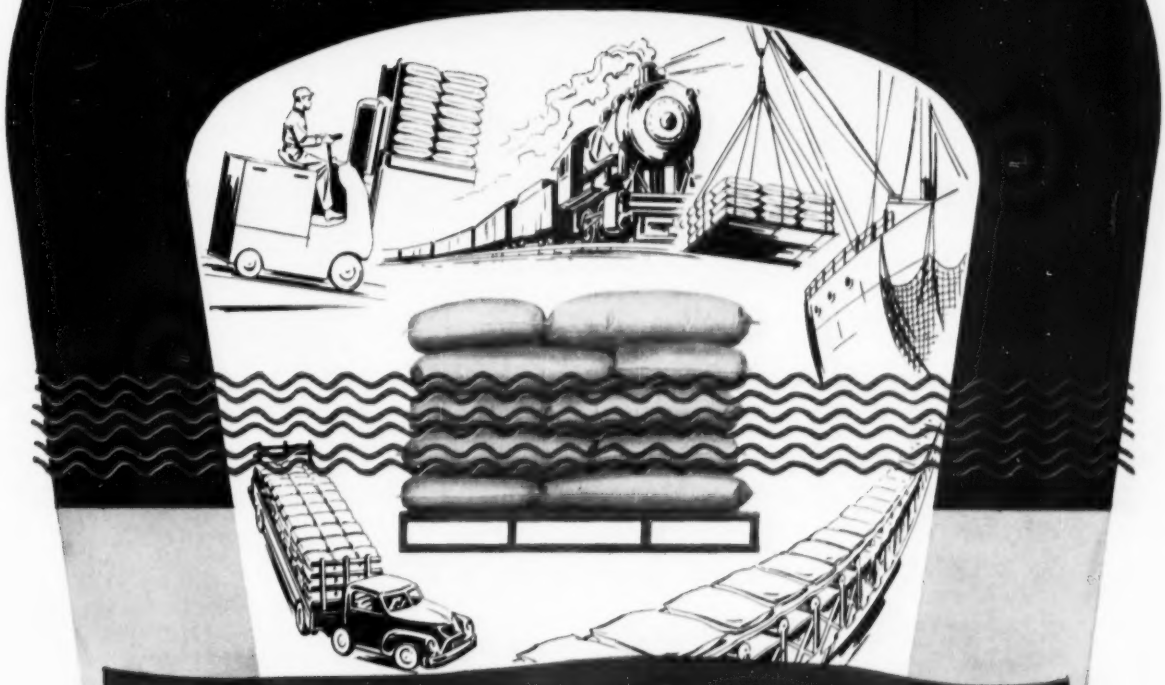

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sion will be directed from the new research center.

In addition to the above appointments, H. M. Albright, formerly president of the United States Potash Company, has been made a special consultant to the new Company. Paul Speer was elected vice president and legal advisor and N. C. Pearson, vice president in charge of borax sales in overseas markets. R. F. Steel was elected secretary & treasurer; W. F. Dingley and W. A. Ackerman were appointed assistant secretaries and R. C. Dosta was appointed assistant treasurer of the new Corporation.

Safety Council Aims Campaign at Falls

Accidental falls—surpassed only by motor vehicle accidents as a killer—is the target of a nationwide campaign to be launched on Sept. 1 by the National Safety Council. In the nation's industrial operations alone, more than 450,000 workers are temporarily or permanently disabled annually. Continuing to Aug. 31, 1957, the campaign will be an across-the-board operation, hitting at accidental falls wherever they may occur in industry, at home, public places—wherever there are people.

DAVISON REALIGNS FUNCTIONS

In a general realignment of organization functions and responsibilities, designed for maximum efficiency in a period of rapid expansion, Davison Chemical Company Division of W. R. Grace & Co., has created new operating divisions along product lines, in charge of general management executives reporting to W. E. McGuirk, Jr., executive vice-president, and Marlin G. Geiger, president.

Heading the Chemicals, Agricultural Chemicals and Mixed Fertilizer Divisions as vice-presidents and general managers are respectively F. C. Nicholson, formerly vice-president for chemical operations; David N. Hauseman, formerly vice-president for marketing, and W. N. Watmough, Jr., who remains in essentially his previous position. Each of the divisions is an autonomous unit with its own functional services such as engineering, traffic, financial, purchasing and industrial relations.

Under Mr. Hauseman in the Agricultural Chemicals Division, J. M. Harris is assistant general manager. He was formerly manager of the company's phosphate rock division in Florida. William Caspari, Jr., is sales manager of agricultural chemicals, approximately his previous post.

HAUSEMAN

WATMOUGH

Assisting Mr. Watmough is A. C. McCall as executive officer. He was formerly branch plant manager at Joplin, Mo.

Change in the branch plant organization of the Mixed Fertilizer Division eliminates the district manager offices. Instead, branch plant managers report directly to Baltimore headquarters.

John W. Ground III is manager at Joplin and responsible also for operations of the New Orleans sales office, and plants at Tulsa, Okla., Trenton, Mo., and Perry, Iowa. R. C. Simms, manager at Charleston, S. C,. has responsibility also for plants at Spartanburg, S. C., and Wilmington, N. C. The latter point is directly under H. G. Barclay, appointed assistant manager to Mr. Simms.

Vance G. Vasbinder is transferred from Lansing, Mich., to Columbus, O., to be assistant to M. C. Evans, manager at the latter point. Their responsibility is for the plants at Alliance and Findlay, O., in addition to Columbus.

E. S. Jackson, manager at Nashville, has appointed Charles T. James as sales supervisor.

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GREEN BAY AND MANITOWOC MACHINERY MANUFACTURERS COMBINE

R. W. Phillips, owner of Chemical Engineering Service and Modern Pant Equipment Co., Green Bay, Wis., has combined his designs, experiences and facilities for manufacturing fertilizer plant equipment with those of Manitowoc Shipbuilding, Inc.

The Green Bay firms had been active in fertilizer building and machinery construction for a number of years and constructed a very large number of new and modern fertilizer and superphosphate plants in the Midwest. They had also pioneered many improvements for the industry including the automatic mixing system, hopper systems, automatic acid dilution and the craneveyor bin filling system.

Manitowoc Shipbuilding, Inc., established in 1902, has been actively engaged not only in the construction of ships but also heavy industrial equipment including dryers, coolers, tanks, cement and paper mill equipment, cranes and dry cleaning plant machinery; has 35 acres of modern manufacturing facilities including large welding, machine and fabricating shops.

This combination will provide ample fabricating facilities as well as an extensive research and engineering staff. Mr. Phillips brings with him the fertilizer experience accumulated over a period of 30 years in plant operations and management as well as that gained in the construction of approximately 28 new and remodeled plants. Chemical Engineering Service had been constructing and installing complete shipping units, hopper systems, granulators and other fertilizer plant equipment. Manitowoc Shipbuilding, Inc., and R. W. Phillips felt that a better service could be provided the fertilizer industry if they pooled their talents and resources for the manufacture of granulators and other equipment since granulation calls for a sturdy precision built equipment as well as a large capital investment. They will manufacture dryers and coolers, granulators, and complete shipping and mixing units as well as hopper systems and other fertilizer plant equipment. This firm is to be known as Chemical Engineering Service Division of Manitowoc Shipbuilding, Inc., and will have offices at Manitowoc, Wisc.

Nitrogen Division Offers Ammonia Leak Detector

A new pocket-size device for detecting ammonia leaks is being offered to agricultural users of ammonia by the Nitrogen Division, Allied Chemical & Dye Corporation.

The device is a booklet containing paper strips impregnated with phenolphthalein. By tearing a strip from the book, saturating it with water and holding it near suspected leaks, the user can detect the presence of ammonia when the color of the paper turns red.

The Ammonia Leaks Test Paper device may be obtained free of charge by writing Department ADV, Nitrogen Division, Allied Chemical & Dye Corporation, 40 Rector Street, New York 6, New York.

Results of Iron Chelate Told In New Bulletin

Those who have attended recent fertilizer conventions, and have noted the stress laid on the use of iron in plant feeding will be interested in the recently published bulletin published by Refined Products Corporation, Lyndhurst, N. J., on the subject of Perma Green Iron 135. This tells in detail the results which have been obtained in orchards, vegetable acreage and shrubs of many types.

The bulletin is illustrated in full color, many of the photographs, both black and white and color, having been loaned for the purpose by National Plant Food Institute. These show the effect of trace element deficiencies in a wide variety of plant. Many color pictures show the contrasts between iron-deficiency plants and those treated with Perma Green Iron 135.

The history of trace-element research is given briefly, and tables are supplied which show the correct application of iron to many types of plant.

Refined Products will be glad to mail copies of this brochure to fertilizer executives who request them.

One of the first tubes produced at the new St. Regis Paper Company multiwall bag plant at Kansas City, Missouri, is examined by, from left to right, Kenneth D. Lozier, St. Regis vice president, Mayor H. Roe Bartle of Kansas City, and Clyde Stinebiser, plant manager. The plant, which has a capacity of 120,000 to 130,000 multiwall bags daily, was opened formally in June.

$4,000 Scholarship Awarded By AP&C

American Potash & Chemical Corporation has announced the winner of its $4,000 William J. Murphy Memorial Scholarship as John Charles Roberts III, of Boulder City, Nev.

The college scholarship was set up by the company in memory of William J. Murphy, AP&CC vice-president in charge of Sales, who died last December.

Presentation of the award was made by Robert B. Coons, AP&CC vice-president, Administration, during recent graduation exercises at Boulder City High School.

CLASSIFIED ADVERTISING

For Sale, Exchange and Wanted Advertisements, same type now used, EIGHT CENTS a word for one insertion; TWELVE CENTS a word for two insertions; FIFTEEN CENTS a word for three insertions, and FOUR CENTS a word for each insertion more than three; ADVERTISEMENTS FOR THIS COLUMN MUST BE PAID IN ADVANCE.

WANTED: Manager for large fertilizer plant—North Midwest Area—Granulation experience preferred. Give age, education, experience first letter. Box #33, c/o Commercial Fertilizer, 75-3rd St., N. W., Atlanta, Ga.

WANTED: Plant manager to take full charge granulation operation and run 10,000 ton plant located in midwest. Write Box Y, c/o Commercial Fertilizer, 75 Third St. N. W., Atlanta 8, Ga.

SALESMANAGER WANTED: Agricultural background essential, must be able to set up own sales department, take care of advertising and all related items. New fertilizer plant going up in the midwest. Write Box No. 36 c/o Commercial Fertilizer and Plant Food Industry, 75 Third St. N. W., Atlanta 8, Georgia.

SITUATION WANTED: Managerial position, thirty years experience in fertilizer industry, covering accounting, plant operation, superintendent, plant design and construction. Now managing business of 100,000 tons annually. Desire connection where wide experience will be compensated. Will consider adequate base salary and participation in profits. Also making some investment. Box 28, Commercial Fertilizer, 75 Third St., N.W., Atlanta 8, Ga.

FOR SALE or rent Fertilizer plant complete with granulation equipment sell on terms. Plant located in Iowa. Box 1251, Sioux City, Iowa.

FOR SALE: Rotary Dryers 5' x 30', 5' x 40', 4'6" x 50', 5' x 67', 6' x 60', 9' x 80'. (1) Pressure Tank 13,000 gal. 220#. Also Mixers, Storage Tanks, Screens, Elevators. Send us your inquiries. Brill Equipment Company, 2402 Third Ave., New York 51, N. Y.

FOR SALE: (3) Sprout Waldron Ribbon Mixers, 336 cu. ft. (12,000 lb.) working capacity. Rotary dryers, 3'6" x 25'; 4'6" x 32'; 4'6" x 40'; 5'6" x 42'; 6' x 50'; 104" x 70'. (70) Welded steel storage tanks from 4300 to 23,000 gal. sizes. Also Hammer Mills, Pulverizers, Bucket Elevators, Conveyors, etc. Perry Equipment Corp., 1426 N. 6th St., Philadelphia 22, Pa.

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